

# LAKE MANITOBA LAKE ST. MARTIN

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## OUTLET CHANNELS PROJECT

MANITOBA TRANSPORTATION AND  
INFRASTRUCTURE

### Red-headed Woodpecker Habitat Management Plan

June 30, 2022

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## DISCLAIMER

This document was developed to support the Environmental Management Program (EMP) for the Lake Manitoba and Lake St. Martin Outlet Channels Project (the Project). It has been prepared by Manitoba Transportation and Infrastructure as a way to share information and facilitate discussions with Indigenous rights-holders, stakeholders and the public. It has been prepared using existing environmental and engineering information, professional judgement, as well as information from previous and ongoing public and Indigenous engagement and consultation. The contents of this document are based on conditions and information existing at the time the document was prepared and do not take into account any subsequent changes. The information, data, recommendations, and conclusions in this report are subject to change as the information has been presented as draft. This draft plan should be read as a whole, in consideration of the entire EMP, and sections or parts should not be read out of context.

Revisions to draft plans have been informed by and will be based on information received from the engagement and consultation process, the Environmental Assessment process, Project planning activities, and on conditions of provincial and federal environmental regulatory approvals received for the Project. As these will be living documents, any changes to the plans that occur after Project approvals are received will be shared with regulators, Indigenous rights-holders and stakeholders prior to implementation of the change. Either a revision number or subsequent amendment would be added to the specific environmental management plan to communicate the revision or change.

## PREFACE

The Lake Manitoba and Lake St. Martin Permanent Outlet Channels Project (the Project) is proposed as a permanent flood control mitigation for Lake Manitoba and Lake St. Martin to alleviate flooding in the Lake St. Martin region of Manitoba. It will involve the construction and operation of two new diversion channels: the Lake Manitoba Outlet Channel (LMOC) will connect Lake Manitoba to Lake St. Martin and the Lake St. Martin Outlet Channel (LSMOC) will connect Lake St. Martin to Lake Winnipeg. Associated with these outlet channels are the development of bridges, control structures with power connections, a new realignment of Provincial Road (PR) 239, and other ancillary infrastructure.

Manitoba Transportation and Infrastructure is the proponent for the proposed Project. After receipt of the required regulatory approvals, Manitoba Transportation and Infrastructure will develop, manage and operate the Project. This Red-headed Woodpecker Habitat Management Plan is one component of the overall Environmental Management Program (EMP) framework, which describes the environmental management processes that will be followed during the construction and operation phases of the Project. The intent of the EMP is to facilitate the timely and effective implementation of the environmental protection measures committed to in the Project Environmental Impact Statement (EIS), the requirements and conditions of the provincial licence issued under *The Environment Act*, the federal Decision Statement issued under the *Canadian Environmental Act 2012*, and other approvals received for the Project. This includes the verification that environmental commitments are implemented, monitored, evaluated for effectiveness, and adjustments made if/as required. It includes a commitment that information is reported back in a timely manner for adjustment, if required.

A key component for the success of the EMP is environmental monitoring, such that environmental management measures are inspected and modified for compliance with environmental and regulatory requirements, including those set out in provincial and federal approvals received for the Project. As indicated, monitoring results will be reviewed and used to verify predicted environmental assessment conclusions and effectiveness of mitigation measures. If unanticipated effects occur, or if mitigation measures are inadequate, adaptive management measures and subsequent monitoring will be applied as described further in individual environmental management and monitoring plans.

Monitoring results and application of adaptive management measures will inform follow-up reporting to regulators and any required revisions to environmental management plans. Manitoba Transportation and Infrastructure has initiated discussions with Indigenous rights-holders and the Rural Municipality (RM) of Grahamdale in the Project area on the establishment of an Environmental Advisory Committee (EAC). The EAC would be a platform for sharing monitoring results and discussing issues of concern. In addition, Manitoba Transportation and Infrastructure anticipates that the EAC will coordinate Indigenous Environmental Monitors and communications during the construction period and will be working with Indigenous rights-holders and stakeholders on its structure and purpose.

Manitoba Transportation and Infrastructure remains committed to consultation and ongoing engagement with Indigenous rights-holders and stakeholders that are potentially impacted by the Project. Detailed EMP review discussions were incorporated into Indigenous group-specific consultation work plans. Engagement opportunities included virtual open house events, sharing draft environmental management and monitoring

plans, sharing plan-specific questionnaires, and meetings to discuss related questions and recommendations. The intent has been to offer multiple avenues to share information about the Project so that rights-holders and stakeholders would be informed and could provide meaningful input into Project planning. The original draft EMP plans and questionnaires that were posted on the Project website for public review and comment are being replaced by the second draft of each plan as it becomes available. Feedback and recommendations received were used to update the current version of the draft plans, which are posted to the Project website at: <https://www.gov.mb.ca/mit/wms/lmblsmoutlets/environmental/index.html>.

Figure A displays a summary of the EMP process. The EMP provides the overarching framework for the Project Construction Environmental Management Program (CEMP) and the Operation Environmental Management Program (OEMP). These will be updated prior to Project construction and operation, respectively, and will consider applicable conditions of *The Environmental Act* provincial licence, *Canadian Environmental Assessment Act 2012* federal Decision Statement conditions and other approvals, any other pertinent findings through the design and regulatory review processes, and key relevant outcomes of the ongoing Indigenous consultation and public engagement processes. Until such time, these plans will remain in draft form.

The purpose of the CEMP and OEMP is to guide how environmental issues will be addressed during construction and operation, respectively, and how adverse effects of activities will be mitigated. The CEMP is supported by several specific or targeted management plans that will guide Manitoba Transportation and Infrastructure's development of the Project's contract documents and subsequently, the Contractor(s) activities, in an environmentally responsible manner and to meet regulatory compliance in constructing the Project. The OEMP will include some of the same targeted plans developed to manage issues during construction, but prior to construction completion, they would be revised and adapted to suit the specific needs during the operation phase.

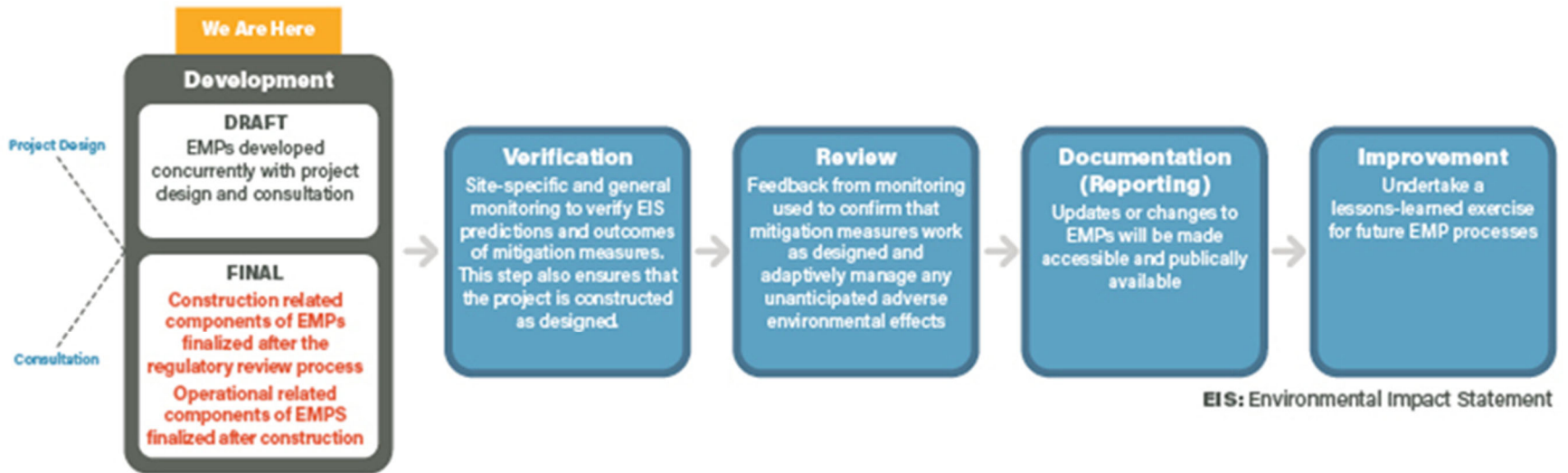


Figure A: EMP Process

## LIST OF ACRONYMS

%	percent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Statement
EMP	Environmental Management Program
ha	hectares
HMA	habitat mitigation area
km/h	kilometres per hour
LAA	local assessment area
LMOC	Lake Manitoba Outlet Channel
LSMOC	Lake St. Martin Outlet Channel
m	metre
m <sup>2</sup>	square metres
MARD	Manitoba Agriculture and Resource Development
MECP	Manitoba Environment, Climate and Parks
PDA	Project development area
PR	Provincial Road
RHMP	Red-headed Woodpecker Habitat Mitigation Plan
RM	Rural Municipality
ROW	right-of-way
RVMP	Revegetation Management Plan
SAR	Species at Risk
the Project	Lake Manitoba and Lake St. Martin Outlet Channels Project

# 1.0 INTRODUCTION

## 1.1 Background and Purpose

The Lake Manitoba and Lake St. Martin Outlet Channels Project (the Project) proposed by Manitoba Transportation and Infrastructure overlaps potential critical habitat for red-headed woodpecker (*Melanerpes erythrocephalus*), listed as endangered under the federal *Species at Risk (SAR) Act* (Government of Canada 2021). Red-headed woodpecker is a cavity-nesting woodpecker that breeds in open deciduous forest or forest edges, and open habitats (e.g., grasslands or pastures containing windrows) where mature or dead trees are available for nesting (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2007, Environment and Climate Change Canada [ECCC] 2021). In 2021, a federal recovery strategy was developed to provide guidance aimed at halting and reversing the population decline of red-headed woodpecker and identifying critical habitat (ECCC 2021).

The recovery strategy identifies 10 x 10 km critical habitat squares throughout this species' Manitoba range (ECCC 2021). These standardized spatial units are used to identify known areas containing confirmed breeding evidence and potential critical habitat. The Project overlaps with one of these squares along the Provincial Road (PR) 239 realignment west of the Lake Manitoba Outlet Channel (LMOC; ECCC 2021; Appendix 1, Figure 1-1). Construction within the Project development area (PDA; i.e., Project footprint) will require clearing of forested habitats that may support red-headed woodpecker habitat but not critical habitat as defined in the species recovery strategy (ECCC 2021; Section 1.4).

Despite no evidence that critical breeding habitat will be directly affected by the Project, Manitoba Transportation and Infrastructure is using a precautionary approach and committing to additional mitigation measures (as described in Chapter 12.7 of the Project Environmental Impact Statement [EIS]), to reduce potential Project-related effects to red-headed woodpecker habitat.

The purpose of this Red-headed Woodpecker Habitat Mitigation Plan (RHMP) is to describe the red-headed woodpecker habitat mitigation and monitoring activities that will be implemented along the LMOC outlet channel right-of-way (ROW).

## 1.2 RHMP Development Process

Development of the RHMP was influenced by both the LMOC engineering design and revegetation plans, and red-headed woodpecker habitat preferences as described in the species recovery strategy (ECCC 2021). The RHMP has continued to evolve and develop in consultation with regulators, stakeholders, and Indigenous rights-holders, with feedback received and addressed either in the RHMP or during meetings and presentations (MTI 2021b; MTI 2021c). As new information becomes available, the RHMP will be updated with additional detail regarding the proposed red-headed woodpecker habitat mitigation described in Section 3.2.2. For example, results from 2021 red-headed woodpecker and decadent tree surveys were used to refine the number and location of areas that will receive habitat enhancements.

## 1.3 Project Overview

The Project will develop a permanent flood control mitigation system for Lake Manitoba and Lake St. Martin for alleviating flooding in the Lake St. Martin region. This will be accomplished through construction of a new outlet channel from Lake Manitoba to Lake St. Martin (LMOC) and a new outlet channel from Lake St. Martin to Lake Winnipeg (Lake St. Martin Outlet Channel [LSMOC]). These new channels will allow for floodwaters to be moved more quickly through Lake Manitoba and Lake St. Martin into Lake Winnipeg. The Project will result in less flooding and reduced lake levels on Lake St. Martin. Other works include re-alignment of PR 239 and a hydroelectric distribution line for operation of the LSMOC (Appendix 1, Figure 1-1).

## 1.4 Project Interaction with Red-Headed Woodpecker Habitat

The Project (i.e., part of the PR 239 realignment ROW) overlaps 35.4 hectares (ha) of the 20,000-ha red-headed woodpecker critical habitat square (0.2 percent [%]); 19.8 ha of which is open deciduous forest, a preferred broad habitat type. Existing land cover data indicates that the Project will result in the direct loss of 1.7 ha of old growth (41 to 80 years) deciduous forest, which suggests the potential loss of decadent trees (potential red-headed woodpecker nest trees) may be minor. Point count surveys completed in 2020 did not reveal the presence of the species where the PR 239 realignment overlaps the critical habitat square (WSP 2020). Additionally, based on Environment and Climate Change Canada data, the only red-headed woodpecker critical habitat polygons known to occur within the local assessment area (LAA) are located greater than 600 m from the PR 239 realignment (ECCC pers. comm. 2020). The Project is not expected to interact with these known critical habitat polygons because of the distance between them. The combination of this data suggests that the Project does not interact with critical habitat.

Red-headed woodpecker are known to occur in areas outside of the critical habitat square, including in the LMOC PDA. Baseline surveys conducted for the Project (EEI 2017; WSP 2020) confirmed the presence of breeding woodpeckers at four locations along the LMOC PDA, and one active nest tree north of Reed Lake that has since fallen over.

## 1.5 Red-headed Woodpecker and Decadent Tree Survey

In 2021, a field survey program was completed in support of the RHMP, with a focus on evaluating the relative abundance and distribution of breeding red-headed woodpeckers and their habitats within the LMOC PDA ROW).

### 1.5.1 Objectives

The objectives of the survey program were to:

- Estimate the number and location of red-headed woodpecker breeding pairs occupying the LMOC PDA.
- Determine the number and location of suitable decadent trees that could be salvaged from red-headed woodpecker habitat along the LMOC PDA for use as restorative habitat post-construction.

## 1.5.2 Methods

The 2021 field survey program contained two separate survey components:

1. a *Breeding Red-headed Woodpecker Survey* to identify forest stands occupied by breeding red-headed woodpecker; and
2. a *Decadent Tree Survey* to quantify the number, and generally identify the location, of decadent trees in forest stands occupied by breeding adults.

### 1.5.2.1 Breeding Red-headed Woodpecker Survey

The Breeding Red-headed Woodpecker Survey was undertaken in mature deciduous forest stands, as identified by species-specific habitat mapping used in the Project EIS (MI 2020), near known snag and/or nest locations (EEI 2017) within the LMOC PDA (Appendix 2, Figure 2-1 and Photo 1), and where aerial imagery suggested the presence of deciduous trees. The total area targeted by the survey was 152 ha of potential red-headed woodpecker habitat intersected by the PDA. Two replicate surveys were completed during the peak breeding season using a removal sampling design (i.e., once the species was detected at a site, it was not re-surveyed). Two teams of two observers completed the first survey replicate from June 23 to 28, 2021, and one team of two observers completed the second survey replicate from July 7 to 10, 2021.

The Breeding Red-headed Woodpecker Survey followed a standardized ten-minute point-count survey protocol (Ralph et al. 1995) that incorporated a call-broadcast component shown to increase the detection probability for woodpecker species (e.g., BC RIC 1999; Baumgardt et al. 2013; Wisconsin DNR 2013). The sequence of broadcast calls used a five-minute passive listening/viewing period, followed by a three-minute active call-broadcast period (rotation between 30 seconds of red-headed woodpecker calls and drumming and 30 seconds of silence), and completed with a two-minute passive listening/viewing period. Surveys were undertaken under the authority of Manitoba Agriculture and Resource Development (MARD) SAR Permit No. SAR21012.

Surveys were completed using a digital data collection application specifically designed for point-count surveys. A total of 57 locations were surveyed for breeding red-headed woodpecker near patches of potential red-headed woodpecker habitat (i.e., open deciduous forest or forest edges, and grasslands or pastures containing windrows; COSEWIC 2007; ECCC 2021) located on and/or immediately adjacent to the LMOC PDA (Appendix 2, Figure 2-1). Survey sites were located a minimum of 300 metres (m) apart to reduce the likelihood of counting the same individuals more than once. Surveys were completed during periods of suitable weather (i.e., clear visibility, wind  $\leq 20$  kilometres per hour (km/h), temperature  $> 0^{\circ}\text{C}$ , and precipitation not exceeding a light, intermittent drizzle) and started at sunrise and ended within 4.5 hours of sunrise (Bibby et al. 2000). The resulting species detection data are summarized by survey site and mapped relative to the Project in order to provide an understanding of the presence and distribution of red-headed woodpecker.

Confirmed red-headed woodpecker nest trees identified during point count surveys were georeferenced, photographed and left undisturbed. General characteristics of nest trees were documented including approximate tree height, dbh, presence of cavities, height of nest cavity, and other relevant site conditions.



### 1.5.2.2 Decadent Tree Survey

The Decadent Tree Survey was used to identify decadent trees, as defined in the federal red-headed woodpecker recovery strategy (deciduous trees  $\geq 18$  centimetres [cm] ddb that are also dead or dying or trees with one or more large  $\geq 13$  cm] dead or dying limbs; ECCC 2021), along the LMOC PDA. The survey was undertaken in 13 forest stands with confirmed breeding red-headed woodpecker activity (as established by the *Breeding Red-headed Woodpecker Survey*) and in seven randomly selected deciduous forest stands. A total of twenty forest stands (approximately 25% of all deciduous forest stands within the PDA) were surveyed from June 23 to 28 and from July 7 to 10, 2021.

For relatively small forest stands ( $\leq 10,000$  square metres [ $m^2$ ]), the entire forest stand was surveyed to identify the location and number of suitable decadent trees present. For larger stands ( $> 10,000 m^2$ ), a standardized circular plot method (11.28 m radius plot [ $400 m^2$  plot]; White 2013) was used to survey a representative  $4,800 m^2$  portion of the stand (12 plots per stand).

Surveys were completed using a digital data collection application specifically designed for decadent tree/snag surveys. This application georeferenced the location of decadent trees and logged information on decadent tree characteristics such as tree health and condition, trunk integrity, approximate tree height, trunk dbh, presence of cavities, height of cavities, if present, and other relevant tree characteristics. All decadent trees surveyed and recorded received a unique Decadent Tree ID using the same naming convention: **Sxx-Txx**, where **Sxx** is the forest stand ID (previously administered) and **Txx** is the tree ID (administered in the field). All decadent trees were identified in the field in two ways:

1. using flagging tape tied around the trunk of the tree and the Decadent Tree ID labelled on the tape using permanent marker; and
2. a more permanent copper tree tag nailed to the north side of the trunk of the tree with the Decadent Tree ID labelled the tag by engraving it with a pen.

The resulting Decadent Tree Survey data are summarized relative to relevant tree characteristics and mapped relative to the Project to provide an understanding of the presence and distribution of decadent trees on the LMOC PDA.

## 1.5.3 Results

### 1.5.3.1 Breeding Red-headed Woodpecker Survey

The Breeding Red-headed Woodpecker Survey resulted in 15 sites with detections of one or more breeding individuals. With the exception of one survey site, all red-headed woodpeckers detected during point count surveys were within the PDA, and in or near forest patches targeted by the survey. An additional seven incidental observations of the species were made outside of the early morning survey window.

All 14 of the sites along the PDA with confirmed breeding activity had one or more individuals detected during the first survey period (June 23 to June 28, 2021) and 12 of the 14 (86%) detections occurred during the active call-broadcast survey period (i.e., after the passive 5-minute survey period).

### 1.5.3.2 Decadent Tree Survey

The Decadent Tree Survey was completed in 20 forest stands located within the LMOC PDA (Appendix 2, Figure 2-1 to Figure 2-15 and Photo 3). Of the 20 stands, 13 supported red-headed woodpecker (one large stand had two detections of breeding individuals). See Appendix 2, Table 2-1 for a complete copy of the data collected for the Decadent Tree Survey.

A total of 414 decadent trees were identified in the 20 surveyed forest stands. An additional 4 decadent trees were observed outside the targeted deciduous forest stands and surveyed incidentally. Notable summary statistics regarding the surveyed decadent trees are provided below.

- The number of decadent trees observed in the surveyed deciduous forest stands ranged from 0 to 89, with an average of 21 decadent trees per stand or 30.9 trees/ha.
- The mean dbh of the surveyed decadent trees was 24 cm.
- 185 (44%) of the surveyed decadent trees were dead; 43 (10%) were in poor health; 95 (23%) were in fair health; and 95 (23%) were in relatively good health.
- 65 (16%) of the surveyed decadent trees had one or more cavities.
- Of the surveyed decadent trees with cavities, 56% were trembling aspen (*Populus tremuloides*), 31% were balsam poplar (*Populus balsamifera*), 2% were white birch (*Betula papyrifera*), 1% were bur oak (*Quercus macrocarpa*), 1% were Manitoba maple (*Acer negundo*), and 8% were unidentifiable species due to substantial decay.

Observations of a red-headed woodpecker entering a decadent tree cavity confirmed that at least 1 red-headed woodpecker nesting tree exists on the PDA. Another 3 possible nesting trees were identified on the PDA based on red-headed woodpeckers calling from, flying to and from, and/or sitting on a decadent tree with a nesting cavity. These observations are summarized in Table 1.

A visit to the red-headed woodpecker nesting tree identified on the PDA during 2016 baseline surveys (14N 530725E 5689963N; EEI 2017) revealed that it had fallen over and was no longer viable for nesting (Appendix 2, Photo 4).

Table 1: Summary of Confirmed and Possible Red-headed Woodpecker Nesting Trees

Nesting Evidence	Tree Characteristics				Stand Characteristics		Photo No.
	Species	Health	Height (m)	dbh (cm)	Stand Area (ha)	No. Decadent Trees	
<b>Confirmed</b>	Trembling Aspen	Dead	3	18.5	0.4	8	5
<b>Possible</b>	Trembling Aspen	Fair	20	30	0.7	26	6
<b>Possible</b>	N/A (advanced decay)	Dead	9	29	0.7	26	7
<b>Possible</b>	Trembling Aspen	Poor	11	27	1.1	89	8

## 2.0 MITIGATION GOALS AND OBJECTIVES

The goal of the RHMP is to enhance breeding habitat opportunities for red-headed woodpecker along the LMOC ROW. This will be achieved by employing the mitigation measures and adaptive management techniques outlined in the RHMP during the construction and operation phases of the Project.

Specific objectives are to:

- Describe revegetation prescriptions (i.e., shrub plantings) and vegetation management practices that provide habitat opportunities for red-headed woodpecker, while adhering to requirements for the safe operation and maintenance of the Project (Section 3.0).
- Describe LMOC ROW habitat mitigation, including erecting salvaged snags and/or decadent trees and artificial nest structures (Section 4.0).
- Describe how revegetation prescriptions and nest structure occupancy by red-headed woodpecker will be monitored to verify the effectiveness of mitigation measures (Section 5.0).

### 3.0 GENERAL PROJECT MITIGATION

Construction of the outlet channels will require clearing of the 400 m-wide ROW and parts of the PR 239 realignment ROW, but mitigation measures outlined in the Project Environmental Requirements (PERs) will reduce potential effects to red-headed woodpecker and their habitats. These include:

- A decadent tree survey was completed in June and July 2021 (see Section 1.5), prior to vegetation clearing activities which will be used to assess the prevalence of decadent trees in the PDA while also identifying candidate trees for salvage (Section 3.2.2).
- Treed habitats within the PDA will be retained where safe and technically feasible to do so.
- Clearing will not be scheduled to occur between April 1 and August 31 to avoid disturbance to nesting birds and other wildlife (ECCC 2018).
- If clearing is scheduled to occur within the nesting period (April 1 to August 31), a nest survey will be undertaken by a qualified wildlife biologist if warranted. In the event an active nest is found, it will be subject to site-specific mitigation measures (i.e., clearly marked protective buffer around the nest and/or non-intrusive monitoring).
- The provincially recommended setback distance for vegetation clearing and construction activities of 200 m from an active red-headed woodpecker nest will be adhered to between April 15 to August 15 (MB CDC 2015).

To promote establishment of a healthy vegetation cover for the Project and to allow for the proper function of water flow, the following measures are part of the maintenance program during the operations phase:

- Maintenance of the vegetation cover in areas where erosion might be present.
- Ongoing mowing of the outside drain to promote drainage.
- Occasional mowing of shrubs and trees that encroach on berms to maintain channel hydraulic function.
- Ongoing weed control.

## 4.0 OUTLET CHANNEL RIGHT-OF-WAY HABITAT MITIGATION

Habitat mitigation for red-headed woodpecker includes both revegetation prescriptions (and subsequent maintenance during the operation phase, as outlined in the Revegetation Management Plan [RVMP]) and nest structure replacement that are described in greater detail in the following sections.

### 4.1 Revegetation Prescriptions

The goal of the RVMP is to revegetate upland areas of the outlet ROWs in a manner that promotes the establishment of grassland communities consisting of native and agronomic grasses and forbs along the LMOC. To protect structural integrity and maintain hydrological function, shrubs and trees are discouraged from growing along the channel and on spoil piles/berms, but are acceptable in peripheral areas of the ROW (Figure 1). Figure 1 below identifies where shrubland prescriptions may be added to a schematic cross section of the LMOC. Revegetation prescriptions involving native shrub plantings will provide habitat for wildlife including red-headed woodpecker as this species nests in open deciduous forests and forages in open grassland and shrubland habitat (ECCC 2021). For the purposes of the RHMP, red-headed woodpecker habitat mitigation areas (HMAs) are those areas where shrub plantings and installation of decadent trees/snags and/or nest boxes are planned along the LMOC ROW (i.e., along the peripheral edges the ROW that lie adjacent to deciduous forest [Figure 1; Appendix 1, Figure 2-2]). A total of 20 proposed HMAs have been identified for red-headed woodpecker habitat enhancement along LMOC (Appendix 1, Figure 2-2).

Native plant species will be used to revegetate the LMOC ROW where possible, including native shrubs within the HMAs. The ROW outside of the HMAs will be revegetated with herbaceous plant species only (e.g., native grasses; see RVMP). Revegetation activities will occur in spring or fall depending on the construction schedule and if applied in the fall, prescriptions may require adjustments to improve survivability of seed during winter for herbaceous cover (see RVMP).

OUTLET CHANNEL RIGHT-OF-WAY HABITAT MITIGATION

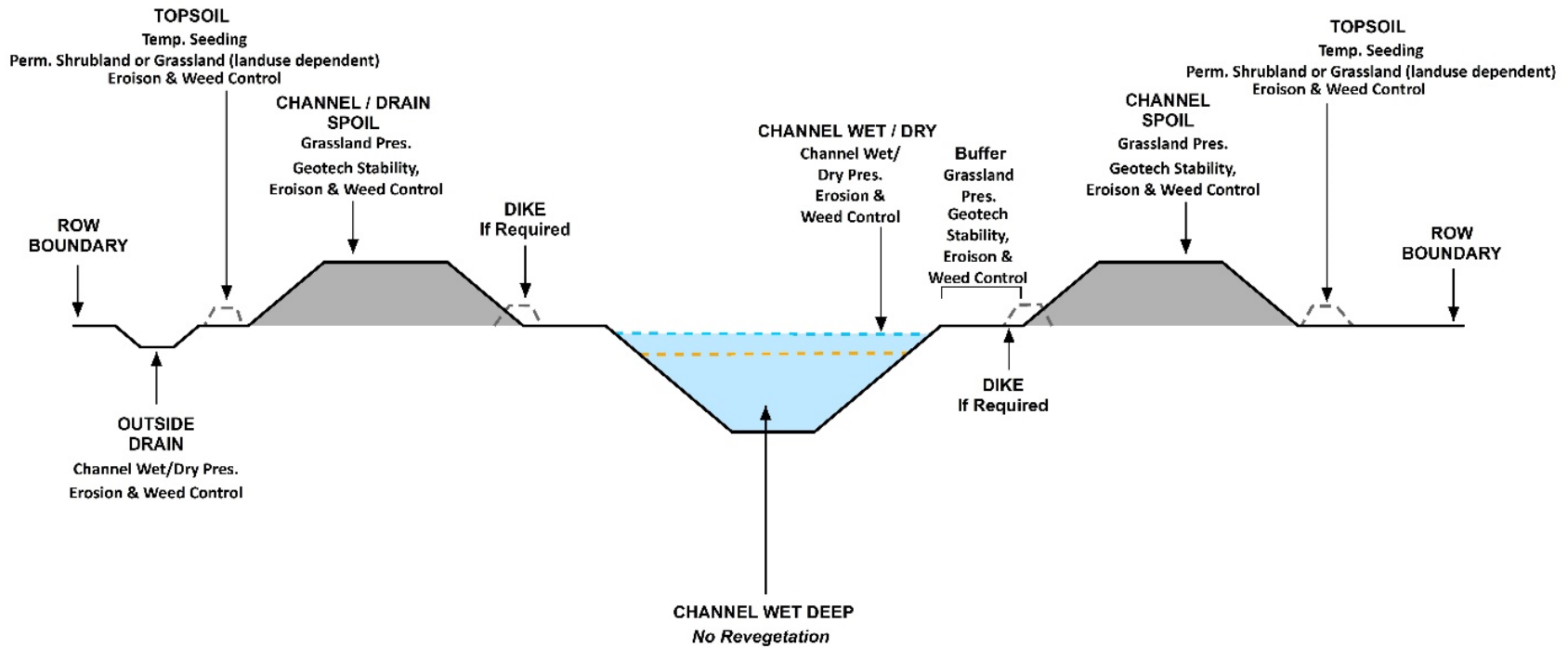


Figure 1: Schematic of LMOC ROW

**Figure 1.** Schematic illustrating the main components of the LMOC ROW. The HMAs will be located between the ROW boundary and outer edge of the outside drain (as shown on the left of the diagram) and between the ROW boundary and outer edge of the channel soil berm or topsoil berm (as shown on the right of the diagram).

## 4.2 Nest Structure Mitigation

Red-headed woodpecker habitat will be enhanced using nest structure mitigation that incorporates the identification, salvage, and installation of snags and decadent trees and the addition of artificial nest structures which are described in greater detail below.

### 4.2.1 Salvaged Decadent Trees

A total of 85 decadent trees will be salvaged during ROW clearing and stored off-site until construction has been completed. Appendix 3, Table 3-1 contains a list of the 85 decadent trees to be salvaged that were identified as being suitable at the time of writing; however, if trees become unsuitable or unavailable over time, suitable alternatives meeting the criteria described below may be salvaged. Salvage of 85 trees considers loss due to damage or decay while in storage or during transportation. Salvaged trees will include the one red-headed woodpecker nest trees identified during surveys that are in good to fair condition, while two other nest trees that were dead and decaying will not be salvaged (Section 1.5.3). The remaining 83 trees were identified by selecting those with the largest available dbh and the following criteria:

- minimum tree height of 10 m
- overall tree condition is good or fair, but excluding trees with unknown or poor trunk condition
- presence of one or more existing cavities

Installation of salvaged decadent trees will include measures to reduce the likelihood of decadent trees falling over, such as attaching decadent trees to treated wooden posts; NRCS 2008) and integrity monitoring (Section 5.3). A total of 40 salvaged decadent trees will be installed in 20 HMAs (i.e., two per HMA) along the LMOC ROW (Appendix 1, Figure 1-2; Appendix 2, Figure 2-2 to Figure 2-15; Appendix 3, Table 3-2).

### Artificial Nesting Structures

Artificial nesting structures will provide cavities for nesting red-headed woodpecker by installing wooden nest boxes in the HMAs within the ROW adjacent to where mature deciduous forest habitats occur. Nest boxes, known to be used by woodpecker species (e.g., McComb and Noble 1981) including red-headed woodpeckers (e.g., Grabber and Grabber 1977, Kale II and Maehr 1990), will be constructed and installed on the reinstalled decadent trees where there are no existing cavities, or existing cavities are below 5 m above ground level.

Should they be required, nest box will be installed between 5 to 9 m above ground level on the tree and facing away from the prevailing winds. Nest boxes will be made of wood from slow rotting tree species (cedar is preferred; avoid treated wood) and built to the following specifications (CWF 2022), including:

- Entrance hole diameter: 6 cm
- Height of hole above floor: 25 cm
- Floor panel: 15 x 15 cm
- Roof panel: 15 x 20 cm
- Width of wall panels: 15 cm
- Height of wall panels: 140 cm



## OUTLET CHANNEL RIGHT-OF-WAY HABITAT MITIGATION

- Sides cut at an angle to have a front-sloping roof
- Drain holes in the floor and vent holes under the roof
- Filled with wood shavings prior to installation

## 5.0 MONITORING AND FOLLOW-UP

To assess the effectiveness of the implementation of the RHMP, monitoring activities within the HMAs will include a red-headed woodpecker nest survey and an associated nest structure inspection. In response to feedback received from ECCC, a red-headed woodpecker point-count survey will also be completed within reference habitats in the LAA and regional assessment area (RAA) to provide a regional comparison of breeding occurrence. Surveys at HMAs will use passive methods as recommended by ECCC, to avoid disturbing birds using nest structures. The three types of post-construction surveys are described in greater detail below.

### 5.1 Red-headed Woodpecker Nest Survey

#### Rationale

Mitigation measures have been incorporated into the design of the outlet channels to provide habitat enhancements for wildlife, including red-headed woodpecker. The red-headed woodpecker survey will be used to assess the effectiveness of these mitigation measures by examining the habitat use in the HMAs.

#### Objective

The objective of the red-headed woodpecker survey is to understand if red-headed woodpeckers occupy salvaged decadent trees and artificial nesting structures placed within or adjacent to the HMAs.

#### Measurable Parameter

The measurable parameter for the red-headed woodpecker nest survey is occupancy of salvaged decadent trees or artificial nesting structures by breeding red-headed woodpecker (i.e., number of nest structures used for nesting relative to the number available).

#### Design

Red-headed woodpecker surveys will occur at all HMAs where salvaged decadent trees or artificial nesting structures have been installed.

#### Methods

The red-headed woodpecker nest survey at the HMAs will follow a standardized 30-minute point-count survey protocol that will passively evaluate whether the HMAs are occupied by breeding red-headed woodpeckers (Dudley and Saab 2003). This approach was recommended by ECCC as it reduces the likelihood of disturbing birds nesting in the structures. Other wildlife detected during nest surveys will be recorded as incidentals. Surveys will be completed on two separate occasions during the breeding season (May 21 to July 21; MB BBA 2012) , using a removal sampling design (i.e., once the species is detected at a site, it is not re-surveyed).

The resulting data will be summarized by HMA and mapped relative to the Project to provide an understanding of the presence and distribution of red-headed woodpecker and in relation to mitigation measures.

### Frequency

The red-headed woodpecker nest survey will be completed twice during the peak breeding period described above. Surveys will be undertaken during years 1 to 6 post-construction.

### Decision Trigger / Threshold for Action

Fewer than 20% of the HMAs, including the adjacent forest stand(s), do not contain breeding red-headed woodpeckers.

- Action: Consider adding naturalized nest boxes (i.e., constructed from locally sourced timber) and/or girdling mature trees adjacent to the PDA to increase densities of decadent trees (e.g., Kilgo and Vukovich 2013) and report results to Manitoba Environment, Climate and Parks (MECP) regional wildlife biologist/manager through annual data reports.

## 5.2 Red-headed Woodpecker Point-count Survey

### Rationale

Mitigation measures have been incorporated into the design of the outlet channels to provide habitat enhancements for red-headed woodpecker (i.e., HMAs). The Red-headed woodpecker Point-count Survey will be used to provide a regional context for comparing the abundance and distribution of the species in reference habitats to the results of the red-headed woodpecker nest survey in the HMAs.

### Objective

The objective of the Red-headed woodpecker Point-count Survey is to characterize the occupancy of breeding red-headed woodpecker habitats within reference areas in the LAA and RAA that will provide a regional context for comparing to the effectiveness of HMAs (Section 5.1).

### Measurable Parameter

The measurable parameter for the red-headed woodpecker point-count survey is occupancy of habitat patches within reference habitats (i.e., number of habitat patches used for nesting relative to the number surveyed).

### Design

Surveys will occur in a random sample of reference habitats within the LAA and RAA.

### Methods

Surveys in reference habitats will follow a standardized ten-minute point-count survey protocol (Ralph et al. 1995) that incorporate a call-broadcast component shown to increase the detection probability for woodpecker species (e.g., BC RIC 1999, Baumgardt et al. 2013, Wisconsin DNR 2013). The sequence of calls will use a five-minute passive listening/viewing period, followed by a three-minute active call-broadcast

period (rotation between 30 seconds of red-headed woodpecker calls and drumming and 30 seconds of silence), and completed with a two-minute passive listening/viewing period. Surveys will be conducted during periods of suitable weather (i.e., clear visibility, wind  $\leq 20$  km/h, temperature  $> 0^{\circ}\text{C}$ , and precipitation not exceeding a light, intermittent drizzle) and start at sunrise and ending no later than 4.5 hours after sunrise (Bibby et al. 2000).

Surveys will be completed on two separate occasions during the breeding season (May 21 to July 21; MB BBA 2012), using a removal sampling design (i.e., once the species is detected at a site, it is not re-surveyed). Other wildlife detected during point-count surveys will be recorded as incidentals.

### Frequency

The red-headed woodpecker point-count survey will be completed twice during the peak breeding period and concurrently with the Red-headed woodpecker Nest Surveys (Section 4.1). Surveys will be undertaken during years 1-6 post-construction.

## 5.3 Nest Structure Inspection

### Rationale

Mitigation measures have been incorporated into the design of the outlet channels to provide habitat enhancements for wildlife, including red-headed woodpecker. The nest structure inspection will be used to assess the effectiveness of these mitigation measures by monitoring the structural integrity of salvaged decadent trees and artificial nest boxes.

### Objective

The objective of the nest structure inspection is to understand if the salvaged decadent trees and artificial nesting structures placed within or adjacent to the HMAs remain structurally sound and available for breeding red-headed woodpecker.

### Measurable Parameter

The measurable parameter for the nest structure inspection is a pass/fail for nest structure integrity and availability.

### Design

The nest structure surveys will occur at all HMAs where salvaged decadent trees or artificial nesting structures have been installed.

### Methods

The nest structure inspection will use visual confirmation by a qualified biologist to assess whether the salvaged decadent trees and artificial structures are structurally sound and available (i.e., they remain in place and upright). Notable structural concerns or losses will be reported to Manitoba Transportation and Infrastructure immediately. The assessment of each structure will include detailed documentation of the findings and photographs. Wildlife detected during nest structure surveys will be recorded as incidentals.

### Frequency

The nest structure survey will be completed once per year prior to the breeding season (April 1). Surveys will be undertaken during years 1-6 post-construction.

### Decision Triggers / Thresholds for Action

Over 25% of salvaged decadent trees have compromised structural integrity or have become unavailable.

- Action: Consider replacing the salvaged trees or replacing them with artificial nesting structures and report survey results to MECP regional wildlife biologist/manager through annual data reports.

Over 25% of artificial nesting structures have compromised structural integrity or have become unavailable.

- Action: Consider adding new artificial nesting structures and report survey results to MECP regional wildlife biologist/manager through annual data reports.

A summary of the monitoring criteria for the red-headed woodpecker is provided in Table 2.

**Table 2: Monitoring Criteria for the Red-headed Woodpecker Surveys**

Monitoring Objective	Method	Monitoring Metric	Project Phase	Duration	Frequency
<b>Evaluate the effectiveness of mitigation measures for red-headed woodpecker</b>	Red-headed woodpecker nest survey	Species occurrence	Operation	Years 1 to 6 post-construction	Twice during the peak breeding period
	Red-headed woodpecker point-count survey	Species occurrence	Operation	Years 1 to 6 post-construction	Twice during the peak breeding period
	Nest structure inspection	Structure availability and integrity	Operation	Years 1 to 6 post-construction	Once prior to the breeding period

## 5.4 Habitat Monitoring

Habitat monitoring will be undertaken as part of the monitoring activities outlined in the RVMP for the LMOC (Section 8) and LSMOC (Section 14).

## 6.0 ADAPTIVE MANAGEMENT

Adaptive management is a structured and systematic process focused on improving environmental management by using lessons learned to reduce uncertainty while updating policies and practices (British Columbia Ministry of Forests and Range 2015). Adaptive management allows for the flexibility to identify and implement new mitigation measures or to modify existing ones (CEA Agency 2015).

Adaptive management will be incorporated into the habitat monitoring described above and as part of the adaptive management process outlined in the RVMP (Section 9; MI 2020). As part of the adaptive management process, the ability of salvaged decadent trees to satisfy the intended goals and objectives will be evaluated. If salvaged decadent trees are assessed as ineffective based on these criteria, a root cause analysis of why a measure failed to meet the intended objective will be conducted. This type of analysis helps to prevent similar future failures, but also encourages critical thinking and documentation as part of continued learning.

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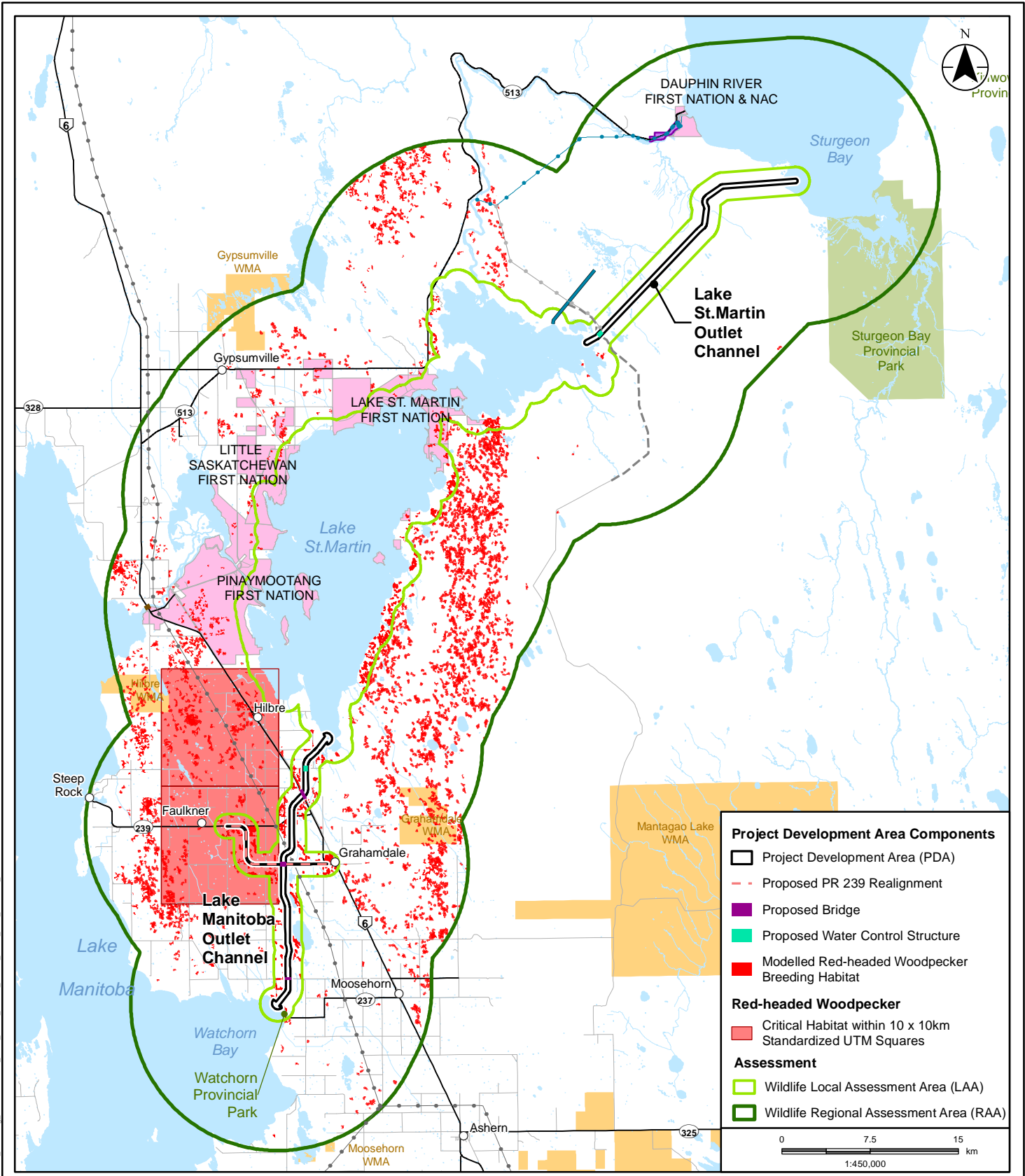
## 7.2 Personal Communication

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# APPENDIX 1

## Figures



**Project Development Area Components**

- Project Development Area (PDA)
- Proposed PR 239 Realignment
- Proposed Bridge
- Proposed Water Control Structure
- Modelled Red-headed Woodpecker Breeding Habitat

**Red-headed Woodpecker**

- Critical Habitat within 10 x 10km Standardized UTM Squares

**Assessment**

- Wildlife Local Assessment Area (LAA)
- Wildlife Regional Assessment Area (RAA)

0 7.5 15 km  
1:450,000

**Legend**

- |  |  |   |
|--|--|---|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: brown; margin-right: 5px;"></span> Fairford Water Control Structure                 | <span style="display: inline-block; width: 15px; border-bottom: 1px solid blue; margin-right: 5px;"></span> Existing Distribution Line   | <span style="display: inline-block; width: 15px; height: 10px; background-color: purple; margin-right: 5px;"></span> Northern Affairs Community (NAC) |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: blue; margin-right: 5px;"></span> Lake St.Martin Emergency Outlet Channel (Reach 1) | <span style="display: inline-block; width: 15px; border-bottom: 1px solid grey; margin-right: 5px;"></span> Planned Distribution Line    | <span style="display: inline-block; width: 15px; height: 10px; background-color: pink; margin-right: 5px;"></span> First Nation                       |
| <span style="display: inline-block; width: 15px; border-bottom: 1px dashed grey; margin-right: 5px;"></span> Lake St.Martin Access Road                              | <span style="display: inline-block; width: 15px; border-bottom: 2px solid black; margin-right: 5px;"></span> Provincial Highway (PTH/PR) | <span style="display: inline-block; width: 15px; height: 10px; background-color: orange; margin-right: 5px;"></span> Wildlife Management Area         |
| <span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> Existing Transmission Line                              | <span style="display: inline-block; width: 15px; border-bottom: 1px solid grey; margin-right: 5px;"></span> Municipal Road               | <span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; margin-right: 5px;"></span> Provincial Park              |

**Notes**  
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 2. Data Sources: Governments of Manitoba and Canada, Manitoba Infrastructure, Environment and Climate Change Canada  
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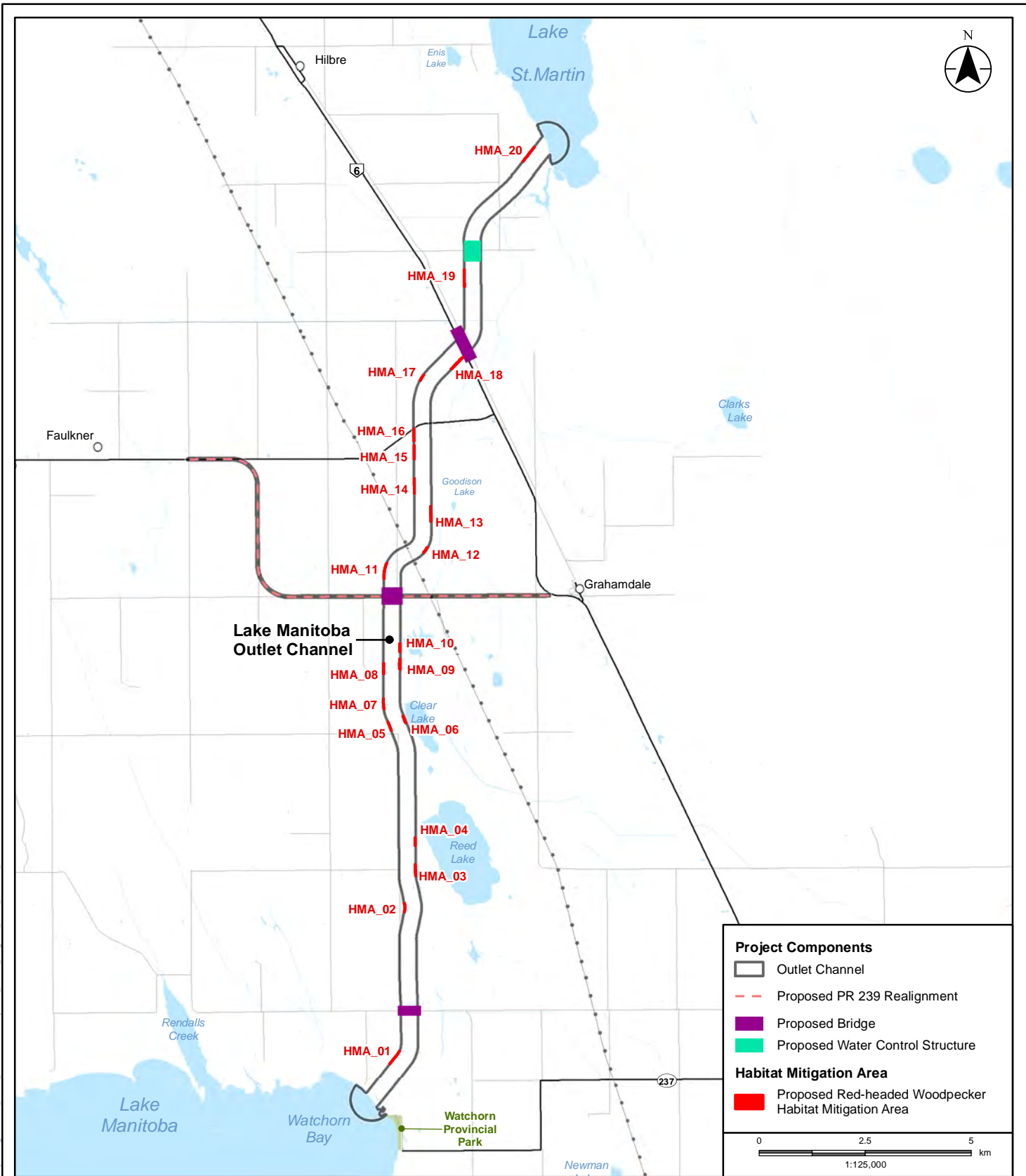


Manitoba Transportation and Infrastructure  
 Lake Manitoba & Lake St. Martin Outlet Channels Project

**Project Overview Map**

**Figure 1-1**

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**Project Components**

- Outlet Channel
- Proposed PR 239 Realignment
- Proposed Bridge
- Proposed Water Control Structure

**Habitat Mitigation Area**

- Proposed Red-headed Woodpecker Habitat Mitigation Area

0 2.5 5 km  
1:125,000

- Legend**
- Existing Transmission Line
  - Provincial Highway (PTH/PR)
  - Municipal Road
  - Provincial Park

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 14N
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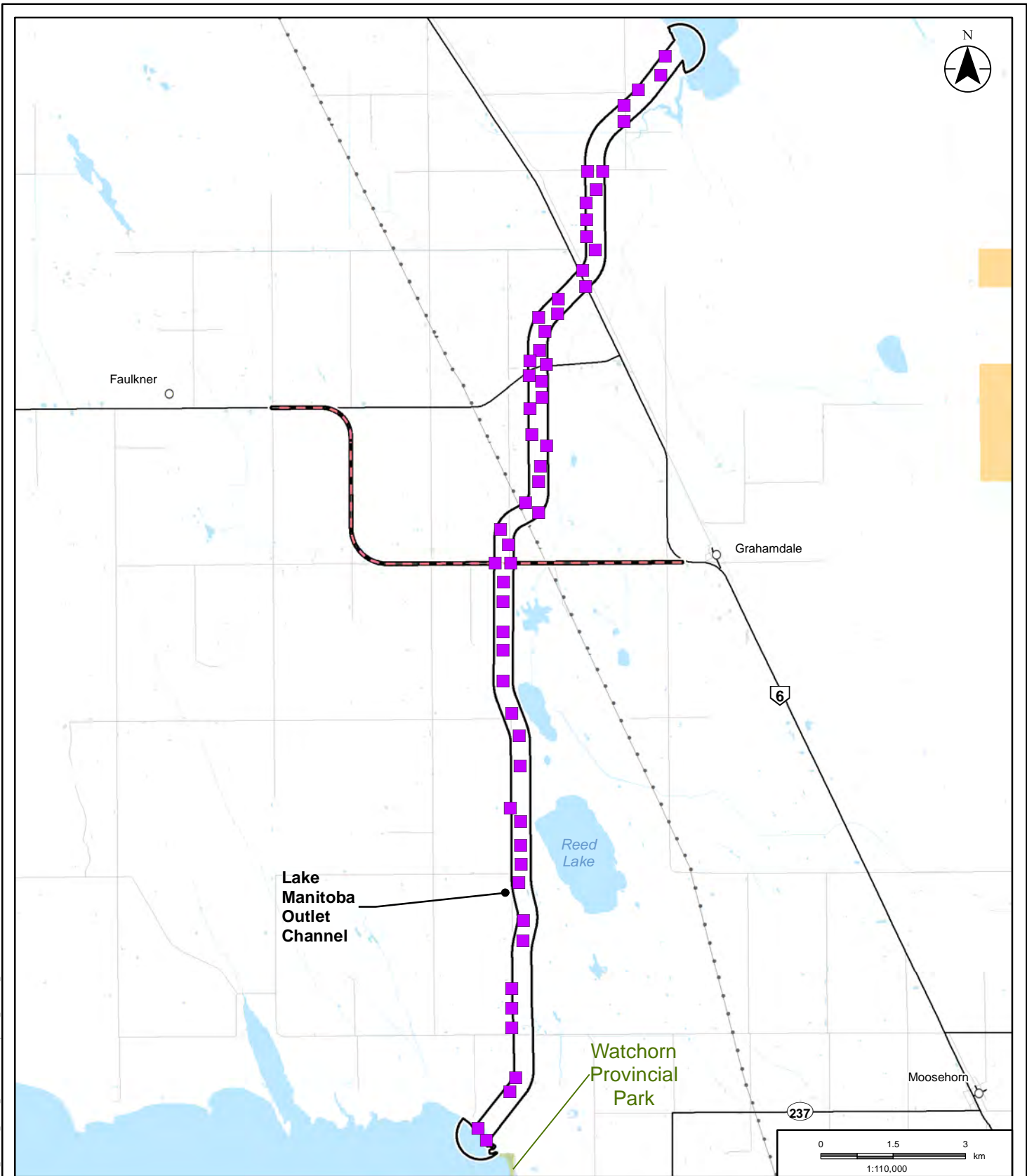
**Proposed LMOCC Red-headed Woodpecker Habitat Mitigation Areas - Overview**

**Figure 1-2**

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## APPENDIX 2

### Red-headed Woodpecker and Decadent Tree Survey: Figures



**Legend**

- |   |   |   |
|---|---|---|
| <span style="color: purple;">■</span> Breeding Red-headed Woodpecker Survey Location  | Base Data   | <span style="background-color: orange; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Wildlife Management Area |
| <span style="border: 2px solid black; display: inline-block; width: 15px; height: 10px;"></span> Project Development Area (PDA) | <span style="border-bottom: 1px dotted black; width: 20px; display: inline-block;"></span> Existing Transmission Line | <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Provincial Park      |
| <span style="border-bottom: 2px dashed red; width: 20px; display: inline-block;"></span> Proposed PR 239 Realignment            | <span style="border-bottom: 1px solid black; width: 20px; display: inline-block;"></span> Provincial Highway (PTH/PR) |   |
|   | <span style="border-bottom: 1px solid gray; width: 20px; display: inline-block;"></span> Municipal Road               |   |

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources: Governments of Manitoba and Canada, Manitoba Infrastructure, Stantec Consulting
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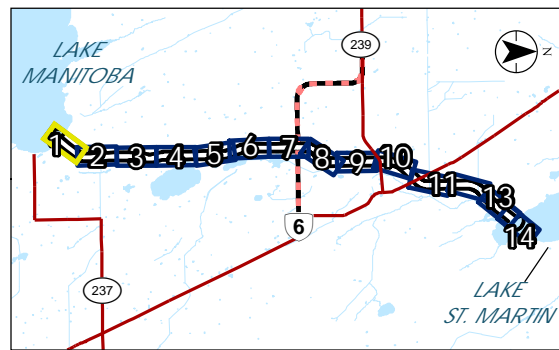
**Breeding Red-headed Woodpecker Survey Overview**

**Figure 2-1**

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**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Major Road
- Quarter Sections
- Decadent Tree Location
- Incidental Decadent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
 3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



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**Client/Project**  
 Manitoba Transportation and Infrastructure  
 Lake Manitoba Outlet Channel  
 Red-headed Woodpecker Surveys

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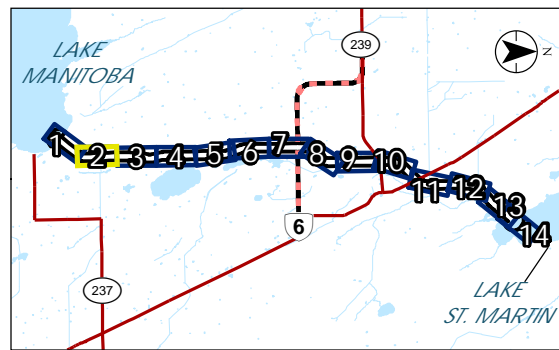
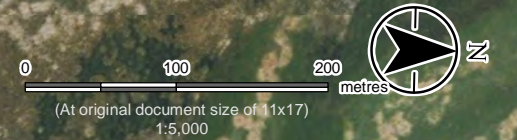
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**2-2**

**Title**  
**Decadent Tree Survey Results 2021**





bing



**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Major Road
- Quarter Sections
- Decedent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
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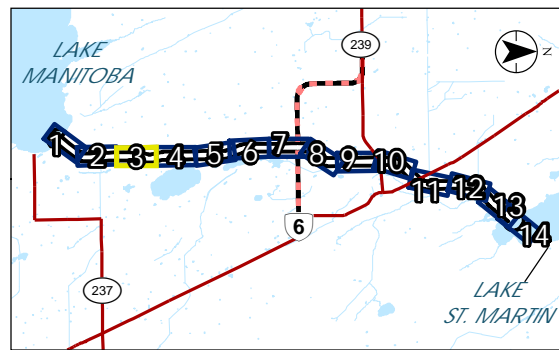
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*Figure No.*  
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*Title*  
**Decedent Tree Survey Results 2021**

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**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Major Road
- Quarter Sections
- Decadent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
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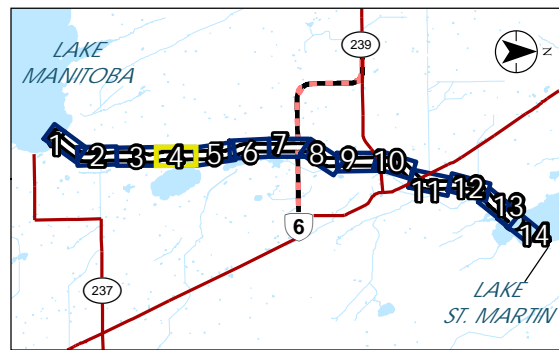
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 Lake Manitoba Outlet Channel  
 Red-headed Woodpecker Surveys

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**Title**  
 Decadent Tree Survey Results 2021

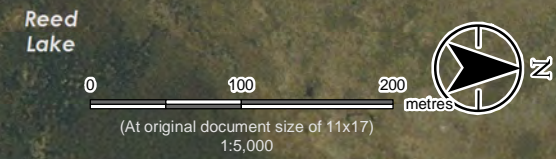




**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Major Road
- Quarter Sections
- Decadent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
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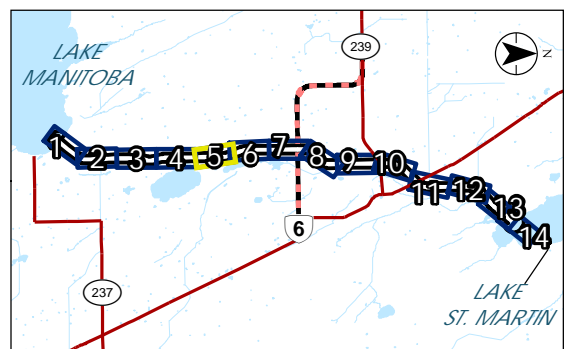
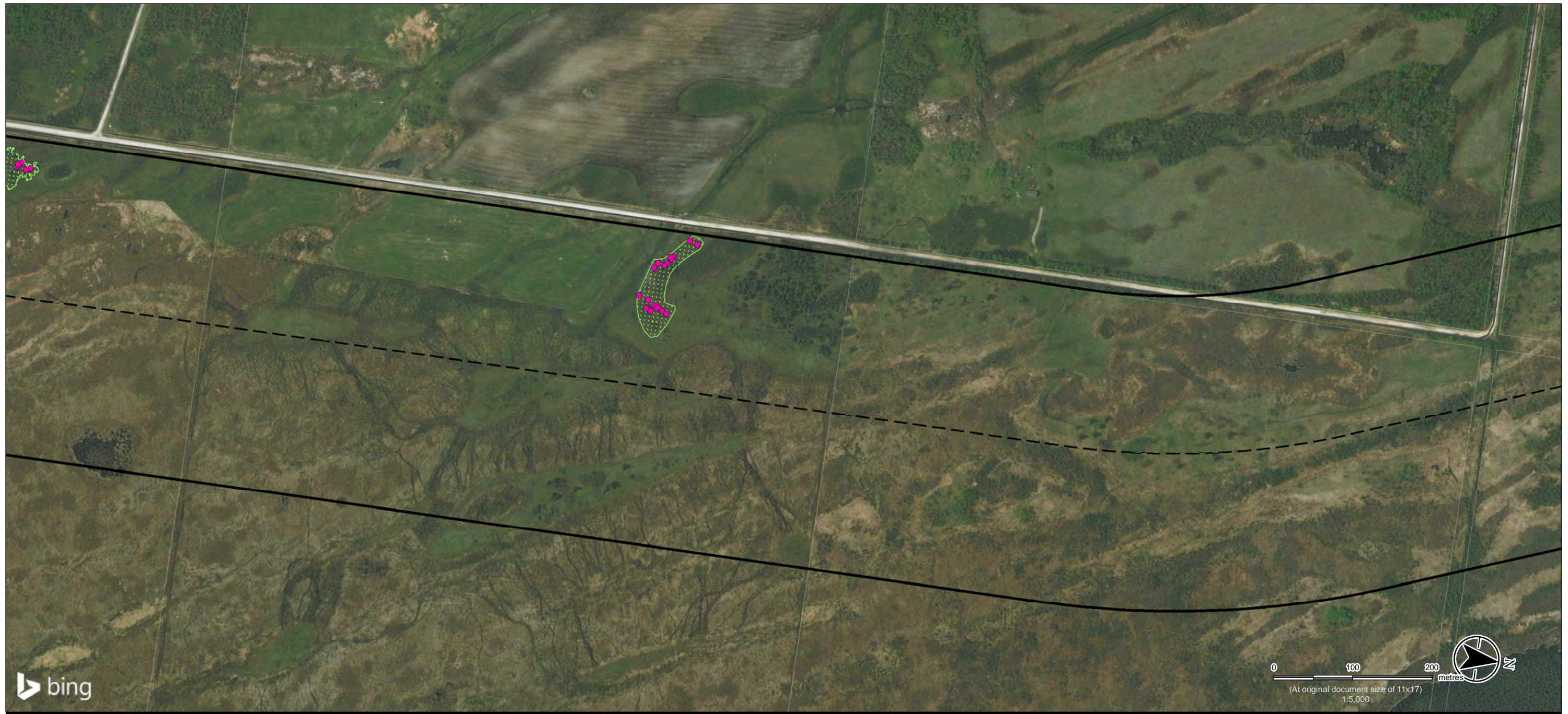
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**Title**  
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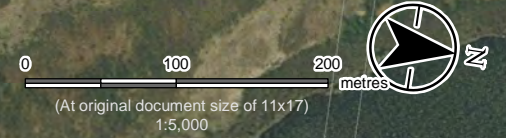
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- Legend**
- Lake Manitoba Outlet Channel (LMOC) Project Development Area
  - LMOC Approximate Centerline
  - Major Road
  - Quarter Sections
  - Decadent Tree Location
  - Surveyed Forest Stand

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.
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Red-headed Woodpecker Surveys

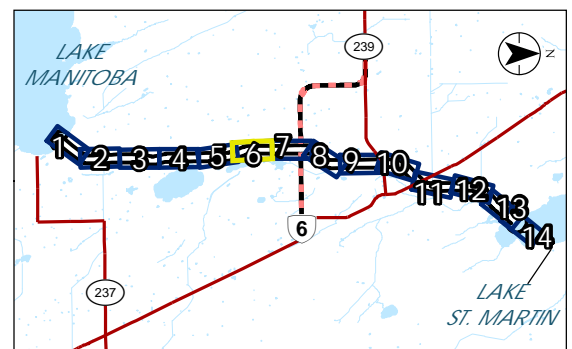
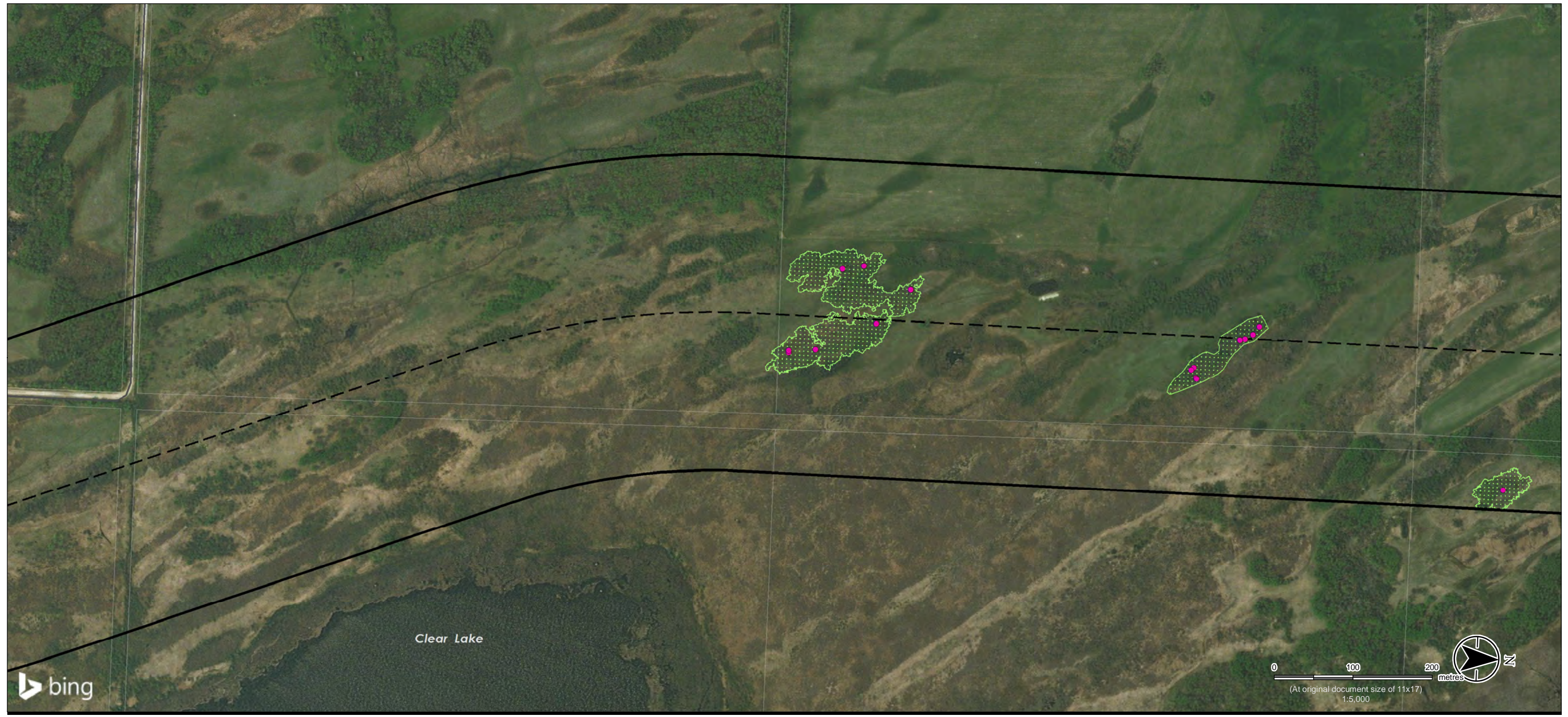
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**Title**  
**Decadent Tree Survey Results 2021**



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**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Major Road
- Quarter Sections
- Decadent Tree Location
- Surveyed Forest Stand

**Notes**

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Near Lake Manitoba & Lake St. Martin  
Manitoba

Prepared by ADC on 2022-06-22  
TR by DR on 2022-06-22

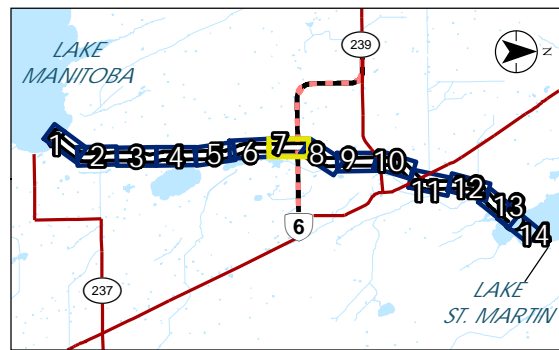
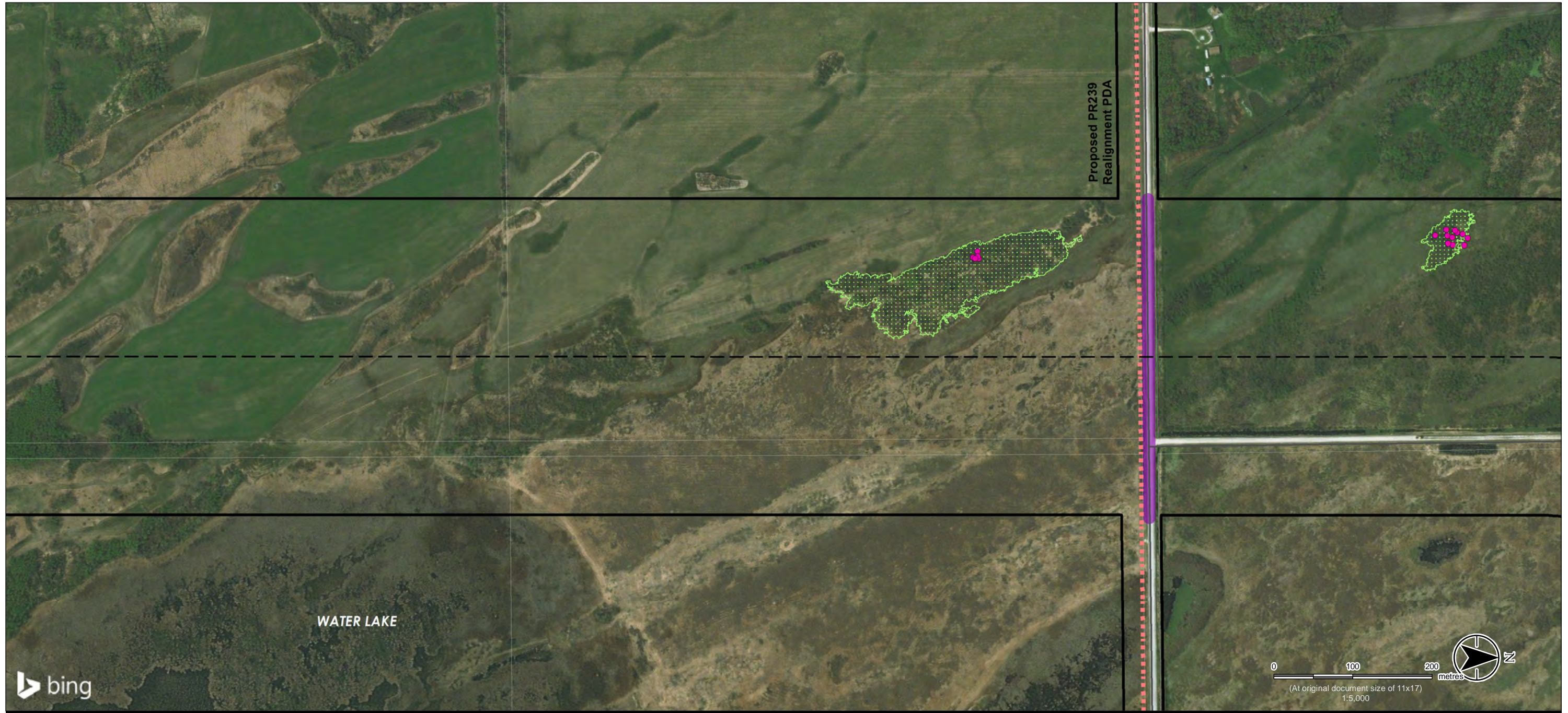
**Client/Project**  
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Lake Manitoba Outlet Channel  
Red-headed Woodpecker Surveys

111475120 REVG

**Figure No.**  
**2-7**

**Title**  
**Decadent Tree Survey Results 2021**

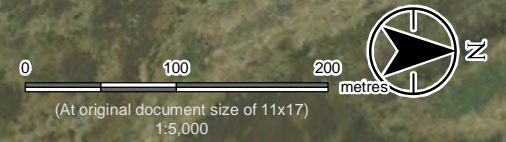




**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Proposed PR239 Realignment
- Proposed Bridge Location
- Major Road
- Quarter Sections
- Decadent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
 3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



**Project Location**  
 Near Lake Manitoba & Lake St. Martin  
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 TR by DR on 2022-06-22

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 Manitoba Transportation and Infrastructure  
 Lake Manitoba Outlet Channel  
 Red-headed Woodpecker Surveys

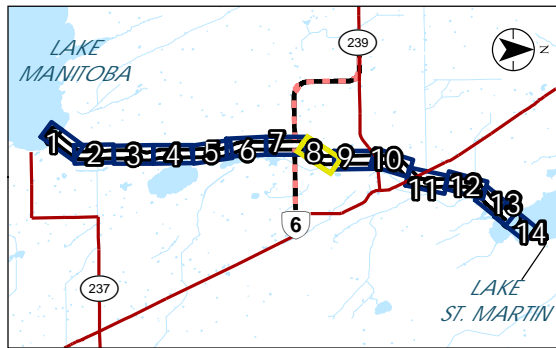
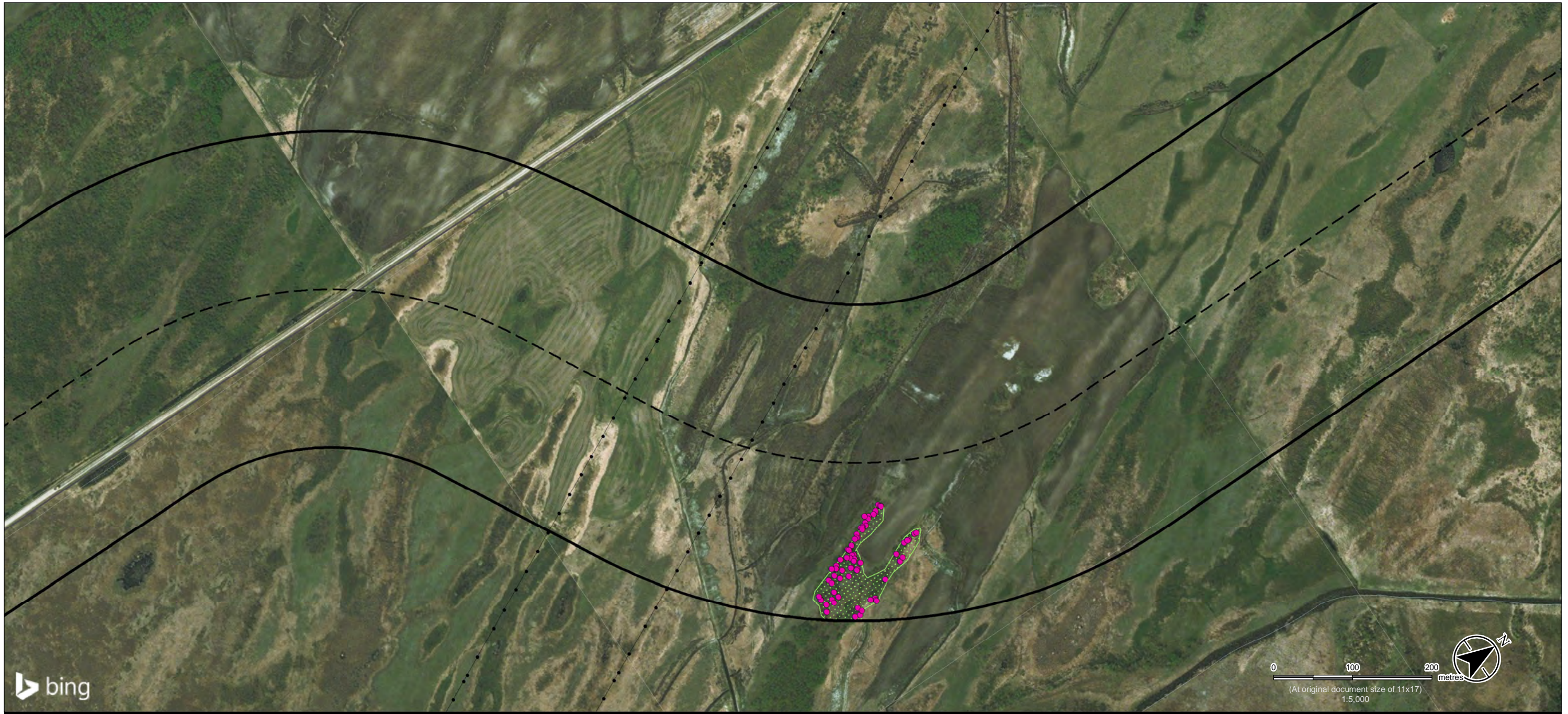
111475120 REVG

**Figure No.**  
 2-8

**Title**  
 Decadent Tree Survey Results 2021

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**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Existing Transmission Line
- Major Road
- Quarter Sections
- Decedent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
 3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



**Project Location**  
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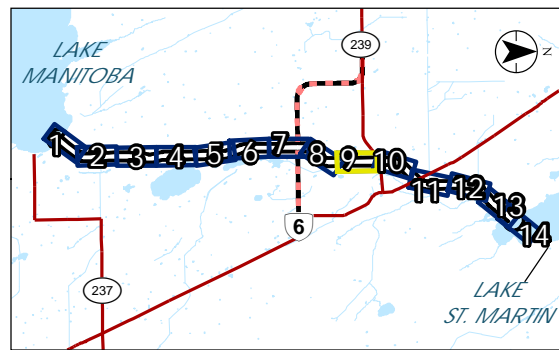
**Client/Project**  
 Manitoba Transportation and Infrastructure  
 Lake Manitoba Outlet Channel  
 Red-headed Woodpecker Surveys

111475120 REVG

**Figure No.**  
 2-9

**Title**  
 Decedent Tree Survey Results 2021





- Legend**
- Lake Manitoba Outlet Channel (LMOCC) Project Development Area
  - LMOCC Approximate Centerline
  - Highway
  - Quarter Sections

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.
3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



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**Client/Project**  
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Lake Manitoba Outlet Channel  
Red-headed Woodpecker Surveys

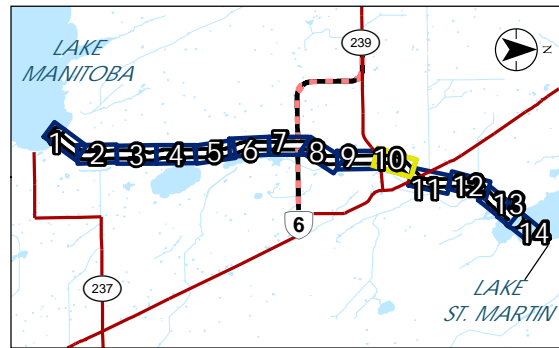
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**Figure No.**  
**2-10**

**Title**  
**Decadent Tree Survey Results 2021**

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**Legend**

- Lake Manitoba Outlet Channel (LMO) Project Development Area
- LMO Approximate Centerline
- Highway
- Quarter Sections
- Decadent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
 3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



**Project Location**  
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 Manitoba

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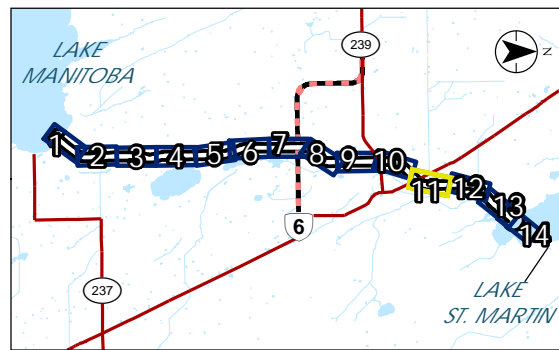
**Client/Project**  
 Manitoba Transportation and Infrastructure  
 Lake Manitoba Outlet Channel  
 Red-headed Woodpecker Surveys

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**Figure No.**  
**2-11**

**Title**  
**Decadent Tree Survey Results 2021**





- Legend**
- Lake Manitoba Outlet Channel (LMOC) Project Development Area
  - LMOC Approximate Centerline
  - Highway
  - Major Road
  - Quarter Sections

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.
3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



**Project Location**  
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**Client/Project**  
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Lake Manitoba Outlet Channel  
Red-headed Woodpecker Surveys

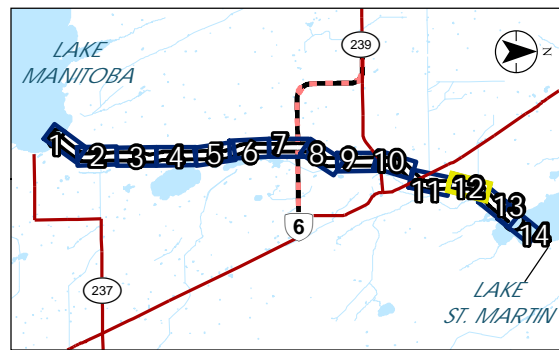
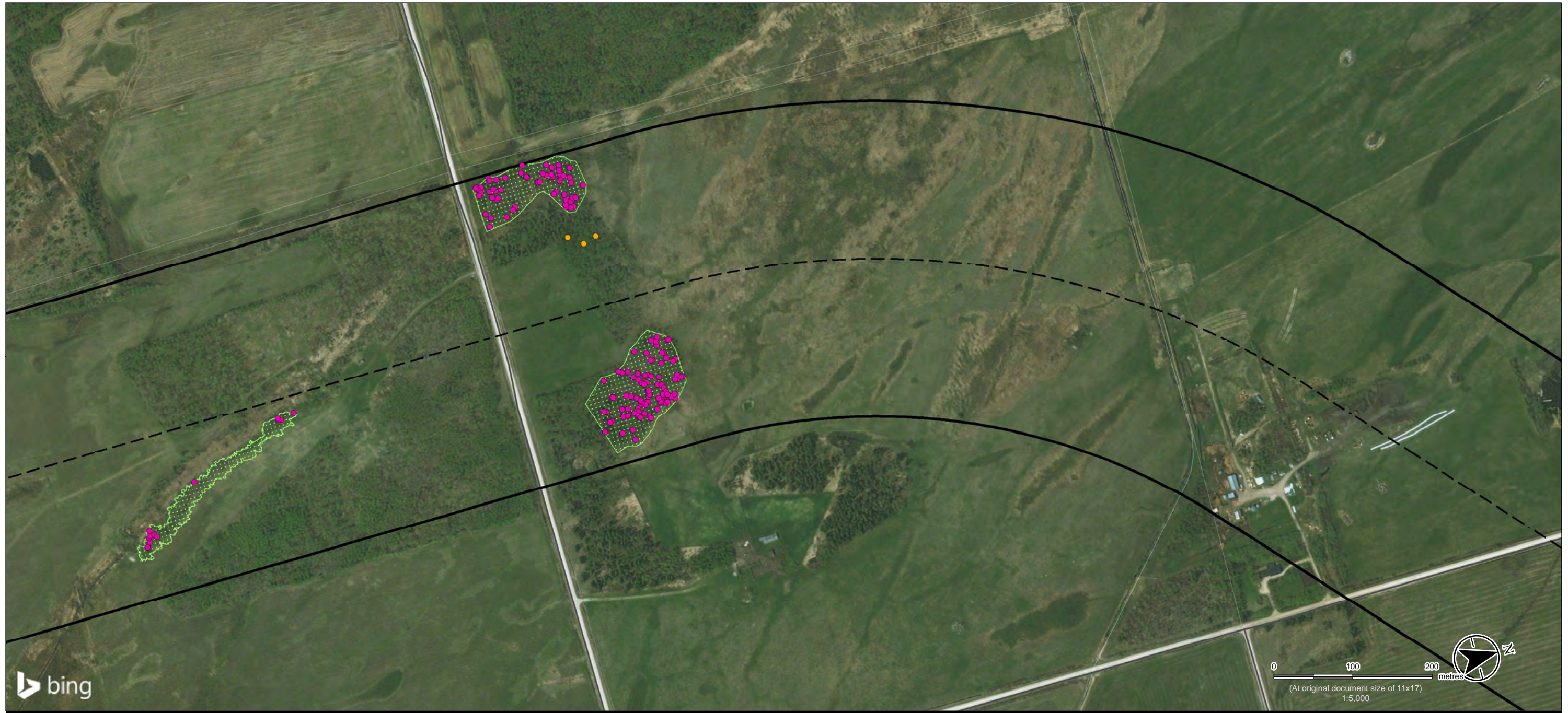
111475120 REVG

**Figure No.**  
**2-12**

**Title**  
**Decadent Tree Survey Results 2021**

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**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Major Road
- Quarter Sections
- Decadent Tree Location
- Incidental Decadent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
 3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



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**Client/Project**  
 Manitoba Transportation and Infrastructure  
 Lake Manitoba Outlet Channel  
 Red-headed Woodpecker Surveys

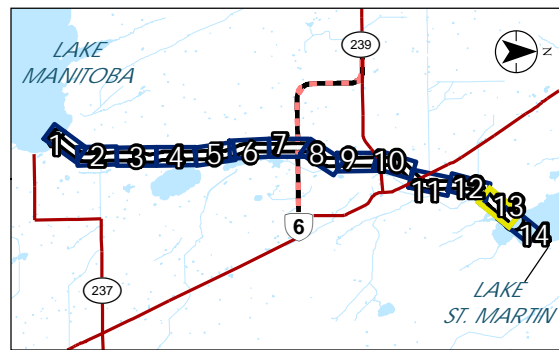
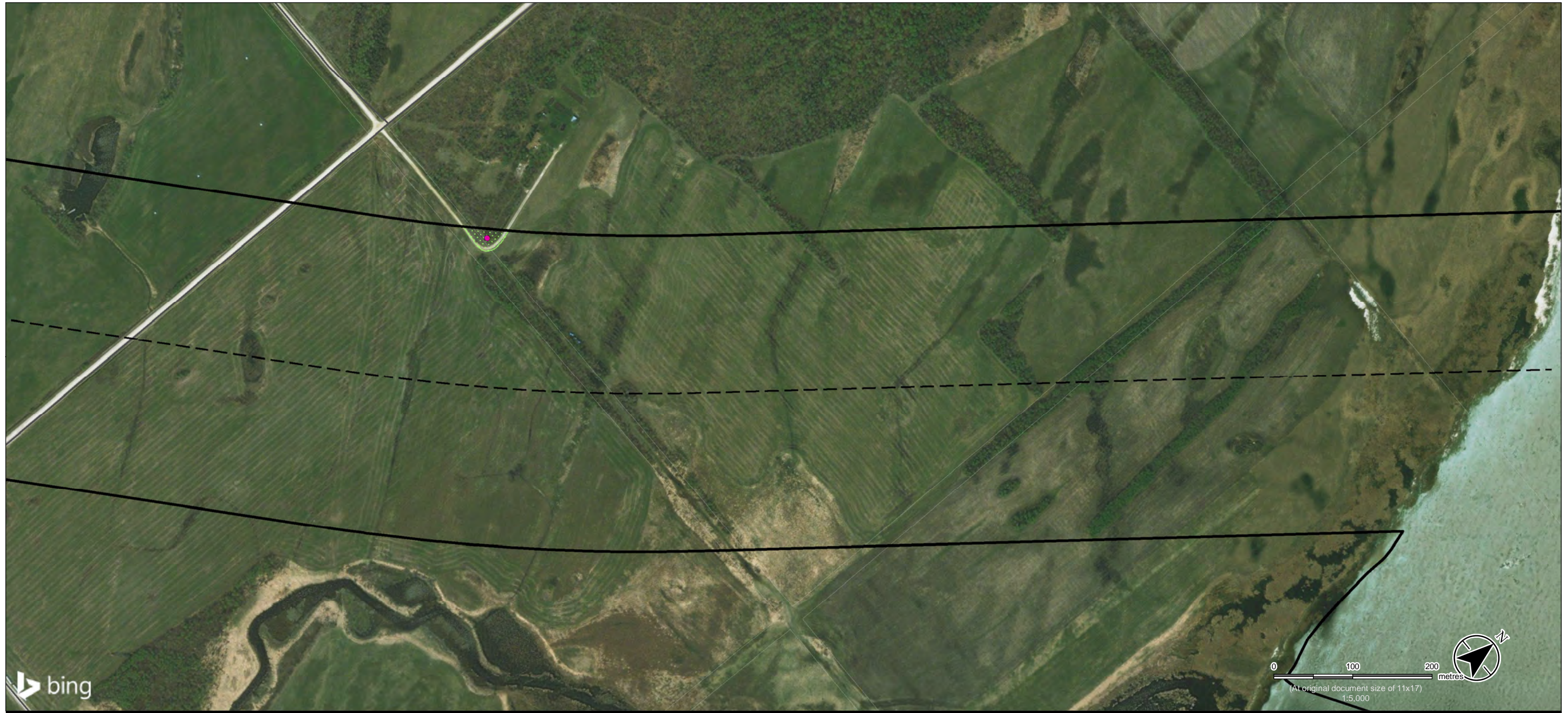
111475120 REVG

**Figure No.**  
 2-13

**Title**  
 Decadent Tree Survey Results 2021

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**Legend**

- Lake Manitoba Outlet Channel (LMOC) Project Development Area
- LMOC Approximate Centerline
- Major Road
- Quarter Sections
- Decadent Tree Location
- Surveyed Forest Stand

**Notes**  
 1. Coordinate System: NAD 1983 UTM Zone 14N  
 2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.  
 3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



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 TR by DR on 2022-06-22

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 Red-headed Woodpecker Surveys

111475120 REVG

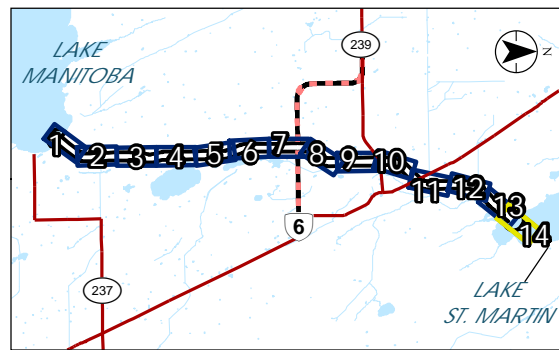
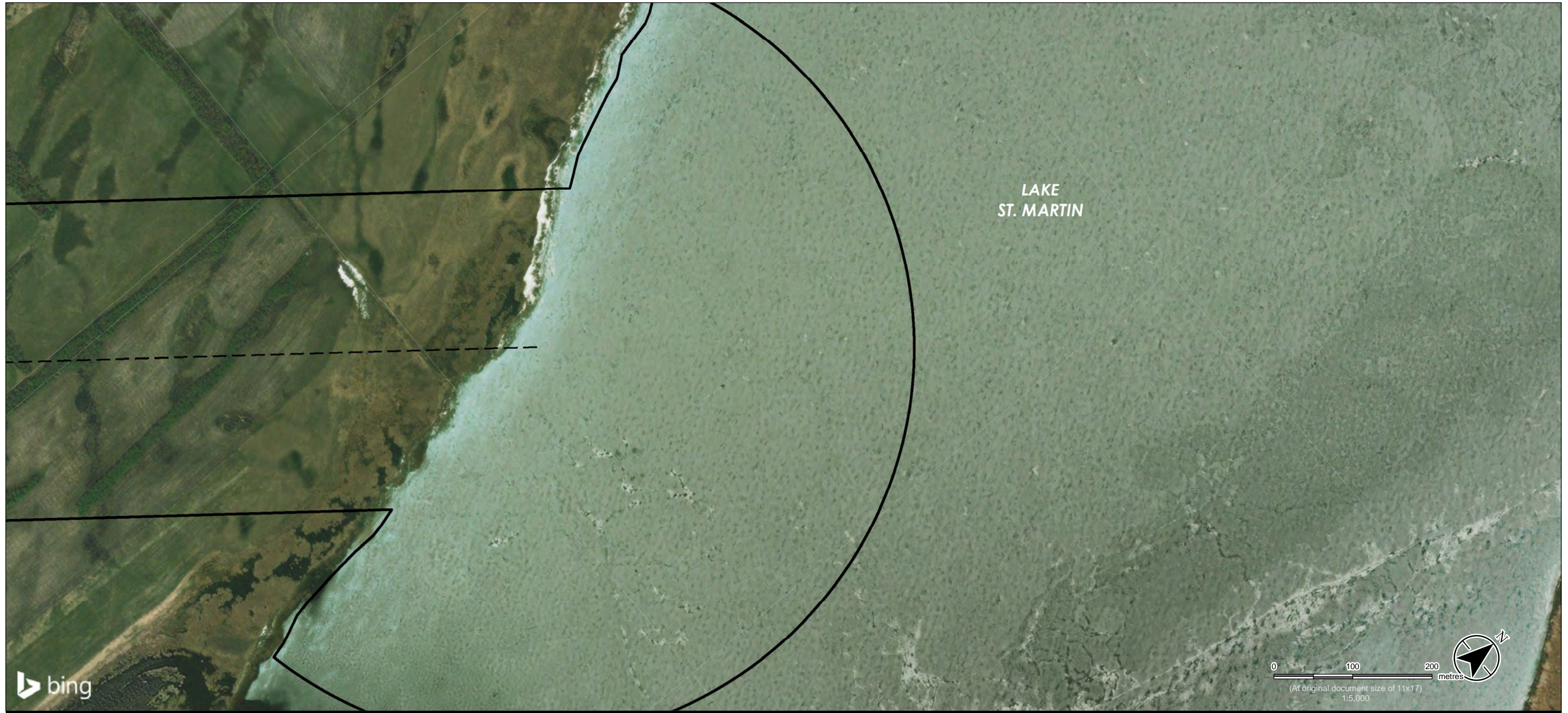
**Figure No.**

**2-14**

**Title**

**Decadent Tree Survey Results 2021**





- Legend**
- Lake Manitoba Outlet Channel (LMOC) Project Development Area
  - LMOC Approximate Centerline
  - Quarter Sections

**Notes**

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources: Government of Manitoba, Stantec Consulting, Manitoba Infrastructure, Government of Manitoba, EcoLogic Environmental Inc.
3. Background Imagery: Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS



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Manitoba

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Manitoba Transportation and Infrastructure  
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Red-headed Woodpecker Surveys

111475120 REVG

*Figure No.*  
**2-15**

*Title*  
**Decadent Tree Survey Results 2021**

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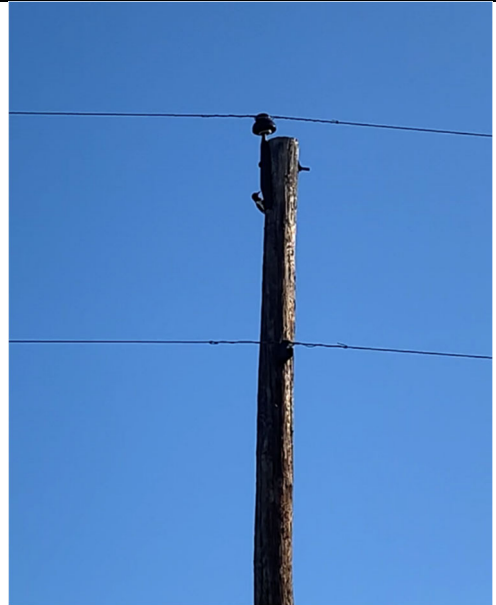


## Red-headed Woodpecker and Decadent Tree Survey: Photographs



**Photograph 1**

*View of red-headed woodpecker habitat on the PDA (14N 532372E 5701506N).*



**Photograph 2**

*View of red-headed woodpecker observation on the PDA (14N 532372E 5701506N).*



**Photograph 3**

*View of Decadent Tree Survey in progress (14N 532149E 5701638N)*



**Photograph 4**

*View of historical red-headed woodpecker nesting tree (EEI 2017; 14N 530725E 5689963N).*





**Photograph 5**

*View of confirmed red-headed woodpecker nesting tree (14N 530674E 5682826N).*



**Photograph 6**

*View of potential red-headed woodpecker nesting tree (14N 530866E 5685510N).*



**Photograph 7**

*View of potential red-headed woodpecker nesting tree (14N 530871E 5685508N).*



**Photograph 8**

*View of potential red-headed woodpecker nesting tree (14N 532370E 5701612N).*

## Decadent Tree Survey: Data

Table 2-1: Decadent Tree Survey Results 2021

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S01	T01	-	67	D	D	D	SO	75	12	N	-	-	N	Y	Y	529779	5681687
FS	S01	T02	MM	35	F	F	F	SO	5	11	N	-	-	N	Y	Y	529787	5681686
FS	S01	T03	-	20	D	D	D	SO	40	-	N	-	-	N	N	N	529790	5681685
FS	S01	T04	-	35	D	D	D	SO	60	13	N	-	-	N	N	N	529796	5681684
FS	S01	T05	MM	42	G	F	F	SO	25	-	N	-	-	N	Y	N	529797	5681679
FS	S01	T06	MM	40	D	D	D	SO	25	12	N	-	-	N	Y	Y	529797	5681678
FS	S01	T07	-	25	D	D	D	SO	30	10	N	-	-	N	Y	Y	529802	5681671
FS	S01	T08	WB	45	D	D	D	SO	15	10	N	-	-	N	N	N	529814	5681666
FS	S01	T09	WB	55	D	D	D	SO	15	10	N	-	-	N	Y	Y	529816	5681664
FS	S01	T10	WB	47	D	D	D	SO	10	8	N	-	-	N	Y	Y	529816	5681665
FS	S01	T11	WB	28	D	D	D	SO	10	10	N	-	-	N	Y	Y	529815	5681665
FS	S01	T12	-	53	D	-	D	SO	50	4	Y	3	N	Y	Y	Y	529827	5681658
FS	S01	T13	WB	24	P	-	D	SO	5	10	N	-	-	N	N	N	529839	5681633
FS	S01	T14	WB	35	D	-	D	SC	15	-	N	-	-	N	N	N	529852	5681621
FS	S01	T15	WB	65	F	D	D	SO	25	15	Y	11	S	N	Y	N	529888	5681577
FS	S01	T16	-	58	P	D	D	SO	30	12	Y	6	S	N	Y	Y	529901	5681562
FS	S01	T17	-	64	D	-	D	SO	60	6	N	-	-	N	N	N	529905	5681555
FS	S01	T18	WB	27	D	-	D	SO	5	6	N	-	-	N	N	N	529927	5681537
FS	S01	T19	-	55	D	-	D	SO	20	8	N	-	-	N	N	N	529993	5681440
FS	S01	T20	-	47	D	D	D	SC	25	-	N	-	-	N	N	N	529996	5681431
FS	S01	T21	-	30	D	D	D	SO	-	7	0	-	-	0	Y	Y	530004	5681400
FS	S01	T22	-	39	P	P	P	SC	40	-	N	-	-	N	N	N	530018	5681397
FS	S01	T23	-	24	D	-	D	SO	10	3	N	-	-	N	N	N	530020	5681380
FS	S01	T24	-	32	F	D	D	SO	20	13	N	-	-	N	N	N	530035	5681366
FS	S01	T25	-	29	F	D	D	-	5	13	N	-	-	N	Y	N	530037	5681364
FS	S01	T26	MM	25	P	R	P	SC	10	10	N	-	-	N	Y	N	530033	5681379
FS	S01	T27	BO	20	D	D	D	SO	5	5	N	-	-	N	Y	Y	530067	5681658

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S02	T01	TA	19	D	D	D	SO	60	4	Y	2	W	N	Y	Y	530615	5682796
FS	S02	T02	TA	20	D	D	D	SO	60	3.5	N	-	-	N	Y	Y	530614	5682797
FS	S02	T03	TA	18	D	D	D	O	20	4	N	-	-	N	Y	Y	530616	5682805
FS	S02	T04	BP	23	D	D	D	SO	25	4	Y	3.5	W	Y	Y	Y	530645	5682831
FS	S02	T06	TA	19	D	D	D	O	20	2.5	N	-	-	N	Y	Y	530630	5682830
FS	S02	T07	BP	20	D	D	D	SO	40	5	N	-	-	N	Y	Y	530642	5682823
FS	S02	T08	TA	20	F	F	F	SC	15	10	N	6	S	Y	Y	Y	530629	5682817
FS	S02	T09	TA	18.5	D	D	D	SO	40	3	N	2.75	N	N	Y	Y	530675	5682826
FS	S04	T01	TA	20	F	F	F	O	10	7	N	-	-	N	N	N	530822	5685588
FS	S04	T02	TA	20	D	D	D	O	10	11	N	-	-	N	Y	N	530822	5685590
FS	S04	T03	TA	20	D	D	D	O	25	12	N	-	-	N	N	N	530822	5685589
FS	S04	T04	TA	25	F	P	F	O	5	-	N	-	-	N	N	N	530835	5685594
FS	S04	T05	TA	20	F	P	F	O	5	-	N	-	-	N	N	N	530841	5685598
FS	S04	T06	TA	22	D	D	D	O	10	-	N	-	-	N	Y	N	530840	5685600
FS	S04	T07	TA	25	-	F	F	O	5	20	N	-	-	N	N	N	530846	5685595
FS	S04	T08	TA	18	F	P	P	O	10	9	Y	8	-	Y	Y	N	530847	5685599
FS	S04	T09	TA	22	D	D	D	O	5	-	N	-	-	N	Y	N	530853	5685585
FS	S04	T10	TA	30	F	F	F	O	10	-	Y	5	N	N	Y	N	530849	5685580
FS	S04	T11	-	27	D	R	D	O	25	5	Y	4	W	N	Y	Y	530836	5685581
FS	S04	T12	TA	34	D	D	D	O	30	13	Y	6	W	Y	Y	Y	530834	5685577
FS	S04	T13	TA	27	F	F	F	O	25	12	Y	10	N	N	N	N	530887	5685587
FS	S04	T14	-	31	D	R	D	O	10	4	N	-	-	N	Y	N	530885	5685583
FS	S04	T15	TA	27	G	F	F	O	10	20	Y	4	E	N	Y	N	530870	5685572
FS	S04	T16	-	25	D	D	D	O	10	12	N	-	-	N	Y	N	530843	5685562
FS	S04	T17	BP	22	D	D	D	O	30	15	Y	8	S	Y	Y	N	530878	5685545
FS	S04	T18	TA	25	D	D	D	O	5	14	N	-	-	N	Y	N	530894	5685529
FS	S04	T19	TA	24	D	D	D	O	20	14	N	-	-	N	N	N	530878	5685516
FS	S04	T20	-	23	D	D	D	O	20	14	N	-	-	N	N	N	530873	5685514



Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S04	T21	TA	30	G	F	F	O	10	20	Y	8	W	Y	Y	N	530866	5685511
FS	S04	T22	-	29	D	R	D	O	25	9	Y	4	E	Y	Y	Y	530872	5685509
FS	S04	T23	BP	30	D	D	D	O	20	16	N	-	-	N	Y	N	530875	5685504
FS	S04	T24	TA	19	D	D	D	O	10	13	N	-	-	N	N	N	530882	5685502
FS	S04	T25	-	26	D	D	D	O	20	14	Y	3	S	Y	Y	N	530885	5685511
FS	S04	T26	TA	27	G	F	G	O	30	18	Y	4	N	Y	N	N	530889	5685518
FS	S06	T01	TA	26	G	P	F	O	35	15	N	-	-	N	Y	N	530730	5686022
FS	S06	T02	TA	18	D	D	D	O	10	-	N	-	-	N	N	N	530731	5686024
FS	S06	T03	TA	21	G	P	F	O	30	14	Y	-	-	N	N	N	530733	5686022
FS	S06	T04	TA	20	D	D	D	O	40	12	N	-	-	N	N	N	530732	5686021
FS	S06	T05	TA	21	F	P	P	O	20	12	N	-	-	N	N	N	530742	5686037
FS	S06	T06	TA	18	D	R	D	O	40	8	N	-	-	N	Y	Y	530737	5686041
FS	S06	T08	TA	19	D	D	D	O	20	12	N	-	-	N	N	N	530731	5686033
FS	S06	T09	-	22	D	D	D	O	10	10	N	-	-	N	Y	N	530716	5686059
FS	S06	T10	TA	20	D	D	D	O	5	9	N	-	-	N	Y	N	530706	5686056
FS	S06	T11	TA	20	D	D	D	O	20	8	N	-	-	N	Y	N	530706	5686059
FS	S06	T12	TA	24	F	P	P	O	10	14	N	-	-	N	Y	N	530701	5686063
FS	S06	T13	TA	22	D	D	D	O	5	12	N	-	-	N	Y	N	530705	5686079
FS	S06	T14	TA	30	G	G	G	O	5	17	N	-	-	N	N	N	530709	5686083
FS	S06	T15	TA	26	D	R	D	O	50	-	N	-	-	N	Y	N	530698	5686097
FS	S06	T16	TA	20	D	D	D	O	5	11	N	-	-	N	Y	N	530696	5686089
P	S10	T01	BP	32	G	F	F	O	15	11	Y	7	-	Y	Y	N	530645	5688077
P	S10	T02	BP	30	F	F	F	O	20	13	N	-	-	N	Y	N	530646	5688055
P	S10	T03	TA	20	P	P	P	O	25	9	N	-	-	N	Y	N	530703	5687987
P	S10	T04	BO	35	G	D	D	O	5	22	N	-	-	N	N	N	530756	5687954
P	S10	T05	BO	33	G	D	F	O	5	20	N	-	-	N	N	N	530756	5687950
P	S10	T06	TA	22	F	P	P	O	15	13	N	-	-	N	N	N	530821	5687969
P	S10	T07	-	25	D	D	D	SO	20	18	N	-	-	N	Y	N	530832	5687929

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S101	T01	TA	25	P	D	P	O	10	12	N	-	-	N	Y	N	530798	5687666
FS	S101	T02	TA	18	D	D	D	O	10	12	N	-	-	N	Y	N	530799	5687662
FS	S102	T01	TA	18	F	P	P	O	5	9	N	-	-	N	Y	N	530549	5689134
FS	S102	T02	TA	19	D	D	D	O	30	-	N	-	-	N	Y	N	530552	5689144
FS	S102	T03	-	22	P	P	P	O	5	-	N	-	-	N	N	N	530571	5689116
FS	S102	T04	BP	-	D	D	D	O	5	-	N	-	-	N	Y	N	530575	5689115
FS	S102	T05	BP	22	P	P	P	O	5	7	N	-	-	N	Y	N	530572	5689113
FS	S102	T06	BP	22	F	P	P	O	40	-	N	-	-	N	Y	N	530581	5689109
FS	S102	T07	BP	19	P	P	P	O	10	8	N	-	-	N	Y	N	530584	5689107
FS	S102	T08	BP	26	P	P	P	O	5	10	N	-	-	N	N	N	530582	5689098
FS	S102	T09	BP	18	D	R	D	O	50	3	N	-	-	N	Y	N	530590	5689095
FS	S102	T10	BP	23	P	P	P	O	20	8	N	-	-	N	Y	N	530589	5689094
FS	S102	T11	BP	20	G	F	F	O	10	5	Y	3	S	N	N	N	530626	5689081
FS	S102	T12	BP	24	D	R	D	O	30	3	N	-	-	N	N	N	530630	5689093
FS	S102	T13	BP	20	-	D	D	O	30	13	N	-	-	N	Y	N	530636	5689101
FS	S102	T14	BP	18	D	D	D	O	10	10	N	-	-	N	Y	N	530636	5689104
FS	S102	T15	BP	25	F	P	P	O	30	11	Y	5	S	N	N	N	530639	5689106
FS	S102	T16	BP	19	D	D	D	O	15	11	N	-	-	N	Y	N	530642	5689112
FS	S102	T17	BP	23	D	R	D	O	20	-	N	-	-	N	Y	N	530645	5689118
FS	S102	T18	BP	22	D	D	D	O	5	9	N	-	-	N	Y	N	530644	5689098
FS	S102	T19	BP	28	G	F	F	O	40	17	N	-	-	N	N	N	530641	5689092
FS	S103	T01	BP	23	P	P	P	O	10	9	Y	2	N	N	Y	N	530366	5691580
FS	S103	T02	BP	24	D	D	D	O	5	11	N	-	-	N	Y	N	530376	5691572
FS	S103	T03	TA	20	D	R	D	O	20	7	N	-	-	N	Y	N	530382	5691562
FS	S103	T04	TA	20	P	F	P	O	10	12	N	-	-	N	Y	N	530384	5691556
FS	S103	T05	BP	21	D	D	D	O	20	14	N	-	-	N	N	N	530421	5691499
FS	S103	T06	-	18	D	D	D	O	5	9	Y	5	N	N	Y	N	530424	5691496
FS	S103	T07	TA	24	D	D	D	O	10	13	N	-	-	N	Y	N	530435	5691503

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S103	T08	TA	26	G	P	F	O	10	14	N	-	-	N	Y	N	530434	5691502
O	S104a	T21	TA	37	G	F	G	O	75	12	Y	5	W	N	Y	Y	532196	5701636
O	S104a	T22	BP	20	D	D	D	O	50	9	Y	1	S	Y	Y	Y	532191	5701653
O	S104a	T23	BP	22	F	P	F	SO	25	8	Y	5	S	N	Y	Y	532183	5701618
FS	S104a	T24	BP	19	G	F	G	SO	40	8	Y	3	S	N	Y	Y	532147	5701636
FS	S104a	T25	BP	20	G	F	G	SO	50	9	N	-	-	N	Y	Y	532148	5701632
FS	S104a	T26	BP	19	D	D	D	SO	5	8	N	-	-	N	Y	Y	532145	5701626
FS	S104a	T27	BP	20	F	F	F	SO	10	6	N	-	-	N	Y	Y	532143	5701627
FS	S104a	T28	BP	22	D	D	D	SO	10	7	Y	2	S	Y	Y	Y	532137	5701628
FS	S104a	T29	TA	22	G	P	F	SO	25	6	N	-	-	N	Y	Y	532141	5701634
FS	S104a	T30	BP	19	D	D	D	SO	10	8	N	6	E	Y	Y	Y	532136	5701638
FS	S104a	T31	BP	19	F	P	F	SO	50	10	Y	3	N	Y	N	N	532138	5701641
FS	S104a	T32	BP	20	D	D	D	SO	5	5	Y	1.5	S	N	Y	Y	532124	5701655
FS	S104a	T33	TA	25	D	D	D	SO	25	7	Y	1	W	Y	N	N	532130	5701629
FS	S104a	T34	BP	18	G	F	G	SO	40	8	N	-	-	N	Y	Y	532123	5701620
FS	S104a	T35	BP	22	D	D	D	SO	25	6	N	6	E	Y	N	N	532126	5701616
FS	S104a	T36	BP	19.5	G	D	P	O	50	8	N	-	-	N	Y	N	532110	5701641
FS	S104a	T37	TA	21	P	D	D	O	30	10	N	-	-	N	Y	Y	532117	5701641
FS	S104a	T38	TA	27	G	P	F	SO	10	9	N	-	-	N	Y	Y	532111	5701628
FS	S104a	T39	TA	24	D	D	D	SO	5	10	N	-	-	N	Y	Y	532108	5701630
FS	S104a	T40	TA	27	P	P	P	O	35	10	N	-	-	N	Y	Y	532099	5701644
FS	S104a	T41	BP	22	D	D	D	SO	50	8	N	-	-	N	Y	Y	532104	5701631
FS	S104a	T42	TA	28	G	F	P	O	10	12	N	-	-	N	N	N	532106	5701634
FS	S104a	T43	BP	23	D	D	D	SO	25	5	N	-	-	N	Y	Y	532100	5701613
FS	S104a	T44	BP	18.5	F	F	F	O	20	11	N	-	-	N	Y	N	532092	5701632
FS	S104a	T45	BP	18	G	F	G	SO	15	10	N	8	W	N	Y	Y	532103	5701620
FS	S104a	T46	TA	18	G	F	F	O	5	9	N	-	-	N	N	N	532098	5701630
FS	S104a	T47	BP	19	G	F	F	O	5	9	N	-	-	N	N	N	532093	5701623

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S104a	T48	TA	19	G	F	G	SO	30	8	N	-	-	N	Y	Y	532105	5701601
FS	S104a	T49	BP	19	F	-	D	O	10	3	N	-	-	N	Y	N	532100	5701620
FS	S104a	T50	TA	22	G	G	G	O	50	-	N	-	-	N	Y	Y	532097	5701610
FS	S104a	T51	TA	20	D	D	D	O	25	11	N	-	-	N	Y	Y	532088	5701617
FS	S104a	T52	TA	19	F	P	P	O	25	7	N	-	-	N	Y	Y	532105	5701603
FS	S104a	T53	BP	20	D	D	D	SO	10	4	N	-	-	N	Y	Y	532096	5701589
FS	S104a	T54	TA	22	D	D	D	SO	10	5	N	1	S	Y	Y	Y	532095	5701589
FS	S104a	T55	BP	18.5	G	P	F	O	1	8	N	-	-	N	Y	N	532089	5701583
FS	S104a	T56	TA	20	D	D	D	O	5	10	Y	6	S	N	Y	Y	532089	5701562
FS	S104a	T57	BP	19	G	F	G	O	0	8	N	-	-	N	Y	Y	532080	5701587
FS	S104a	T58	TA	21	G	P	P	O	10	10	N	-	-	N	Y	N	532088	5701551
FS	S104a	T59	TA	23	D	D	D	SO	10	8	N	-	-	N	Y	Y	532128	5701564
FS	S104a	T60	TA	27	D	D	D	SO	5	8	N	-	-	N	Y	Y	532131	5701561
FS	S104a	T61	TA	21	F	D	P	O	20	11	N	-	-	N	N	N	532102	5701553
FS	S104a	T62	TA	20	D	-	D	O	30	2	N	-	-	N	Y	Y	532084	5701542
FS	S104a	T63	TA	27	F	F	F	SO	10	-	N	-	-	N	Y	Y	532138	5701551
FS	S104a	T64	TA	20	F	P	F	O	50	-	N	-	-	N	Y	Y	532113	5701545
FS	S104a	T65	TA	24	-	F	F	O	25	11	N	-	-	N	Y	Y	532087	5701542
FS	S104a	T66	TA	25	P	P	P	O	15	12	N	-	-	N	Y	Y	532091	5701526
FS	S104a	T67	TA	18	D	D	D	O	5	10	N	-	-	N	Y	Y	532112	5701547
FS	S104a	T68	TA	24	P	D	D	O	25	12	N	-	-	N	Y	Y	532092	5701530
FS	S104a	T69	TA	24	D	D	D	O	15	-	N	-	-	N	Y	Y	532095	5701525
FS	S104a	T70	BP	20	D	D	D	O	75	6	N	-	-	N	Y	Y	532109	5701540
FS	S104a	T71	TA	29	P	P	F	O	60	12	N	-	-	N	Y	Y	532090	5701524
FS	S104a	T72	TA	26	P	D	D	O	60	12	N	-	-	N	Y	Y	532092	5701523
FS	S104a	T73	BP	23	D	D	D	O	25	6	N	-	-	N	Y	Y	532102	5701546
FS	S104a	T74	TA	23	D	D	D	O	5	6	N	-	-	N	Y	Y	532101	5701538
FS	S104a	T75	TA	21	D	D	D	O	5	10	N	-	-	N	Y	Y	532099	5701543

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S104a	T76	TA	27	F	P	D	O	70	13	N	-	-	N	Y	Y	532099	5701527
FS	S104a	T77	TA	23	G	P	F	O	25	10	N	-	-	N	N	Y	532103	5701524
FS	S104a	T78	TA	18	D	D	D	O	20	8	N	-	-	N	Y	Y	532127	5701526
FS	S104a	T79	TA	29	D	D	D	O	5	10	N	-	-	N	Y	Y	532144	5701526
FS	S104a	T80	TA	19	G	P	F	O	30	10	N	-	-	N	N	N	532134	5701531
FS	S104b	T01	BP	20	D	D	D	O	75	8	Y	6	W	Y	Y	Y	532393	5701618
FS	S104b	T02	TA	23	G	P	F	O	50	10	N	-	-	N	Y	Y	532394	5701619
FS	S104b	T03	TA	24	G	F	F	SO	50	12	N	-	-	N	Y	Y	532411	5701626
FS	S104b	T04	BP	24	G	P	F	SO	25	10	N	3	N	N	Y	Y	532411	5701626
FS	S104b	T05	TA	21	G	F	G	SO	75	12	Y	6	S	N	Y	Y	532421	5701625
FS	S104b	T06	TA	22	G	P	F	SO	50	10	N	-	-	N	Y	Y	532421	5701630
FS	S104b	T07	BP	20	D	D	D	SO	5	5	N	-	-	N	Y	Y	532413	5701633
FS	S104b	T08	BP	21	G	F	G	SO	50	10	N	7	W	N	Y	Y	532415	5701646
FS	S104b	T09	BP	20	D	D	D	SO	50	5	Y	4.5	S	N	Y	Y	532419	5701645
FS	S104b	T10	BP	22	D	D	D	SO	25	5	N	-	-	N	Y	Y	532420	5701640
FS	S104b	T100	TA	26	G	F	G	O	5	10	N	-	-	N	Y	Y	532396	5701635
FS	S104b	T101	BP	22	D	D	D	O	50	8	N	-	-	N	Y	Y	532376	5701650
FS	S104b	T102	BP	22	G	F	G	O	50	10	Y	8	N	Y	Y	Y	532367	5701645
FS	S104b	T103	BP	25	D	D	D	O	10	10	N	-	-	N	Y	Y	532366	5701638
FS	S104b	T104	BP	22	G	F	G	O	10	10	N	-	-	N	Y	Y	532364	5701635
FS	S104b	T105	BP	28	D	D	D	SO	25	6	Y	6	N	N	Y	Y	532373	5701657
FS	S104b	T106	BP	22	D	D	D	O	25	7	N	7	W	N	Y	Y	532378	5701668
FS	S104b	T107	BP	25	G	F	G	O	15	10	N	-	-	N	Y	Y	532378	5701665
FS	S104b	T108	TA	27	G	P	F	O	50	11	Y	3.5	S	N	Y	N	532371	5701613
FS	S104b	T109	BP	22	D	D	D	O	50	3	N	2.5	N	N	Y	Y	532381	5701672
FS	S104b	T11	TA	30	G	F	G	SO	25	12	N	-	-	N	Y	Y	532424	5701644
FS	S104b	T110	BP	23	G	F	G	O	10	10	Y	5	W	Y	Y	Y	532393	5701677
FS	S104b	T111	TA	32	G	F	G	O	25	12	N	-	-	N	Y	Y	532395	5701682

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S104b	T112	BP	18	D	D	D	SO	40	10	Y	2	N	Y	Y	Y	532400	5701684
FS	S104b	T113	BP	20	D	D	D	O	25	6	Y	3	E	Y	Y	Y	532405	5701685
FS	S104b	T114	BP	18	G	P	F	O	15	8	N	-	-	N	Y	Y	532387	5701665
FS	S104b	T115	BP	21	G	F	G	O	5	9	N	-	-	N	Y	Y	532415	5701675
FS	S104b	T116	BP	22	G	F	G	O	40	10	N	-	-	N	N	N	532409	5701680
FS	S104b	T117	BP	20	G	F	G	O	10	10	N	-	-	N	Y	Y	532410	5701674
FS	S104b	T118	BP	21	D	D	D	O	15	10	N	8	N	Y	Y	Y	532413	5701690
FS	S104b	T119	BP	22	G	D	F	O	25	11	N	-	-	N	Y	Y	532407	5701681
FS	S104b	T12	BP	18	G	P	F	SO	50	10	N	-	-	N	Y	Y	532430	5701657
FS	S104b	T120	BP	23	D	-	D	O	40	5.5	Y	4	S	N	Y	N	532408	5701686
FS	S104b	T121	BP	25	G	P	F	O	15	10	N	-	-	N	Y	Y	532410	5701695
FS	S104b	T122	BP	18.5	D	D	D	O	30	10	N	-	-	N	Y	N	532392	5701711
FS	S104b	T123	BP	20	D	D	D	O	15	10	N	-	-	N	Y	Y	532394	5701703
FS	S104b	T124	BP	20	G	F	G	O	15	9	N	3	N	Y	Y	Y	532393	5701700
FS	S104b	T125	TA	33	G	P	F	O	40	12	N	2	E	Y	Y	Y	532392	5701709
FS	S104b	T126	TA	22.5	P	-	D	O	20	4	N	-	-	N	Y	Y	532384	5701682
FS	S104b	T127	TA	28	G	P	F	O	50	12	Y	9	N	N	Y	Y	532388	5701705
FS	S104b	T128	BP	20	D	D	D	O	35	-	N	4	W	N	Y	Y	532403	5701664
FS	S104b	T129	BP	27	D	D	D	O	10	6	N	-	-	N	Y	Y	532368	5701707
FS	S104b	T13	BP	24	D	D	D	SO	5	-	N	-	-	N	Y	Y	532411	5701651
FS	S104b	T130	BP	32	D	D	D	O	10	6	N	-	-	N	Y	Y	532370	5701705
FS	S104b	T131	BP	22	F	P	F	O	10	11	Y	8	S	N	Y	Y	532398	5701664
FS	S104b	T132	BP	20	G	P	F	O	50	8	N	7	W	N	Y	Y	532364	5701697
FS	S104b	T133	TA	28	D	D	D	O	60	4	N	-	-	N	Y	Y	532368	5701689
FS	S104b	T134	TA	30	G	F	G	O	10	12	N	-	-	N	Y	Y	532356	5701696
FS	S104b	T135	BP	19	G	P	F	O	10	8	Y	2	E	Y	Y	Y	532342	5701704
FS	S104b	T136	TA	25	G	P	F	O	25	9	N	-	-	N	Y	Y	532342	5701706
FS	S104b	T137	BP	20	P	P	P	O	30	9	Y	2	E	Y	Y	Y	532356	5701694

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S104b	T138	TA	24	G	F	G	O	25	10	N	-	-	N	Y	Y	532335	5701693
FS	S104b	T139	BP	18	D	D	D	O	25	10	N	-	-	N	Y	Y	532339	5701688
FS	S104b	T14	BP	24	G	F	G	SO	60	10	N	-	-	N	Y	Y	532424	5701652
FS	S104b	T140	BP	24	D	D	D	O	70	10	N	-	-	N	Y	Y	532345	5701690
FS	S104b	T141	TA	26	P	P	P	O	10	10	N	-	-	N	Y	Y	532341	5701690
FS	S104b	T142	BP	20	D	D	D	O	20	8	N	-	-	N	Y	Y	532361	5701679
FS	S104b	T143	BP	18.5	D	D	D	O	20	-	N	-	-	N	N	N	532361	5701677
FS	S104b	T144	BP	22	D	D	D	O	50	6	N	5	E	N	Y	Y	532337	5701684
FS	S104b	T145	BP	22	D	D	D	O	40	8	N	6	E	Y	Y	Y	532351	5701675
FS	S104b	T146	TA	21	G	F	G	O	40	9	N	-	-	N	Y	Y	532346	5701660
FS	S104b	T147	TA	24	G	F	G	O	50	12	N	-	-	N	Y	Y	532382	5701656
FS	S104b	T148	BP	21	D	D	D	O	20	8	Y	5	W	N	Y	Y	532386	5701658
FS	S104b	T149	BP	19	D	D	D	O	40	7	N	-	-	N	Y	Y	532389	5701661
FS	S104b	T15	BP	26	D	D	D	SO	20	4	N	-	-	N	Y	Y	532428	5701645
FS	S104b	T16	TA	22	G	P	F	SO	50	-	N	-	-	N	Y	Y	532432	5701658
FS	S104b	T17	BP	22	G	F	F	SO	75	10	N	-	-	N	Y	Y	532423	5701669
FS	S104b	T18	BP	27	D	D	D	SO	10	8	Y	7	W	Y	Y	Y	532410	5701660
FS	S104b	T19	TA	20	D	D	D	SO	50	10	N	3	S	N	Y	Y	532416	5701675
FS	S104b	T20	BP	18	F	P	F	SO	20	7	N	-	-	N	Y	Y	532417	5701682
FS	S104b	T81	BP	23	G	P	F	SO	50	10	N	-	-	N	Y	Y	532404	5701662
FS	S104b	T82	BP	23	G	P	F	SO	40	10	N	-	-	N	Y	Y	532414	5701678
FS	S104b	T83	BP	20	G	F	G	SO	10	11	N	-	-	N	Y	Y	532419	5701681
FS	S104b	T84	BP	18	D	D	D	SO	15	12	N	-	-	N	Y	Y	532418	5701684
FS	S104b	T85	BP	20	D	D	D	O	0	8	Y	4	N	N	Y	Y	532413	5701694
FS	S104b	T86	BP	20	D	D	D	O	0	8	Y	1	W	Y	Y	Y	532416	5701694
FS	S104b	T87	BP	26	D	D	D	SO	25	4	N	-	-	N	Y	Y	532414	5701657
FS	S104b	T88	TA	32	G	F	G	O	50	12	Y	4	S	N	Y	Y	532409	5701653
FS	S104b	T89	TA	35	G	F	G	O	15	12	N	-	-	N	Y	Y	532402	5701647

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S104b	T90	BP	21	D	D	D	SO	15	5	N	3	N	Y	Y	Y	532407	5701652
FS	S104b	T91	BP	20	D	D	D	SO	50	9	N	-	-	N	Y	Y	532440	5701632
FS	S104b	T92	TA	25	D	D	D	SO	10	10	N	-	-	N	Y	Y	532441	5701618
FS	S104b	T93	TA	27	G	F	G	O	50	12	N	-	-	N	Y	Y	532433	5701598
FS	S104b	T94	BP	20	G	F	G	SO	50	12	Y	6	S	Y	Y	Y	532423	5701610
P	S104b	T95	TA	23	D	R	D	O	70	4	N	-	-	N	Y	Y	532453	5701632
FS	S104b	T96	BP	20	D	D	D	SO	80	6	Y	3	N	N	Y	Y	532424	5701607
FS	S104b	T97	BP	22	G	P	F	SO	90	10	N	-	-	N	Y	Y	532409	5701606
FS	S104b	T98	BP	19	G	P	F	SO	90	10	N	5	W	Y	Y	Y	532408	5701603
FS	S104b	T99	TA	22	G	F	G	O	5	10	N	-	-	N	Y	Y	532398	5701641
P	S12	T01	TA	24	G	P	F	O	5	12	Y	9	W	N	N	N	530580	5688296
P	S12	T02	TA	23	G	P	F	O	10	12	N	-	-	N	N	N	530583	5688290
P	S12	T03	TA	19	G	F	F	O	10	8	N	-	-	N	N	N	530575	5688283
P	S12	T04	TA	21	P	D	D	O	20	-	N	-	-	N	Y	N	530577	5688279
P	S12	T05	TA	20	F	R	D	O	50	-	N	-	-	N	Y	N	530581	5688279
P	S12	T06	BP	22	G	F	F	O	5	13	N	-	-	N	N	N	530572	5688249
P	S12	T07	BP	20	F	D	P	O	20	15	N	-	-	N	N	N	530566	5688231
P	S12	T08	BP	20	D	D	D	O	15	14	N	-	-	N	Y	N	530565	5688230
P	S12	T09	BP	22	D	R	D	O	20	-	N	-	-	N	Y	N	530565	5688230
P	S12	T10	-	26	D	R	D	O	20	7	Y	7	S	N	Y	N	530581	5688205
P	S12	T11	TA	26	G	F	F	O	5	11	N	-	-	N	N	N	530583	5688201
P	S12	T13	TA	29	G	F	F	O	5	13	N	-	-	N	Y	N	530556	5688176
P	S12	T14	-	28	D	R	D	O	10	-	N	-	-	N	N	N	530554	5688177
P	S12	T15	BP	35	F	D	D	O	30	22	N	-	-	N	N	N	530553	5688171
P	S12	T16	TA	30	G	P	F	O	30	20	N	-	-	N	N	N	530553	5688166
P	S12	T17	BP	35	P	F	P	O	30	14	N	-	-	N	Y	N	530552	5688125
P	S12	T18	TA	28	D	R	D	O	40	7	N	-	-	N	Y	Y	530562	5688120
P	S12	T19	BP	20	P	F	P	O	30	14	N	-	-	N	N	N	530572	5688051



Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
P	S12	T20	TA	32	G	G	G	O	30	13	N	-	-	N	Y	N	530551	5687992
P	S12	T21	TA	27	F	P	P	O	20	12	N	-	-	N	N	N	530557	5687931
P	S35	T01	-	24	D	R	D	O	50	3	N	-	-	N	Y	Y	530338	5691136
P	S35	T02	-	22	D	R	D	O	30	7	Y	6	N	N	Y	N	530384	5691095
P	S35	T03	BP	35	F	F	F	O	50	17	Y	7	N	Y	Y	N	530312	5691076
P	S35	T04	TA	33	G	F	G	O	25	20	N	-	-	N	N	N	530317	5691049
P	S35	T05	TA	22	D	R	D	O	25	10	N	-	-	N	Y	N	530420	5691020
P	S35	T07	-	20	D	R	D	O	20	5	N	-	-	N	Y	N	530425	5690986
P	S35	T07	-	20	D	R	D	O	20	3	N	-	-	N	N	N	530423	5690986
FS	S37	-	-	-	-	-	-	-	-	-	N	-	-	N	N	N	530558	5691897
P	S42	T01	BP	23	D	R	D	SC	60	4	N	-	-	N	Y	N	530257	5693176
P	S42	T02	TA	25	F	P	P	SC	40	14	N	-	-	N	Y	N	530267	5693177
P	S42	T03	TA	24	G	G	G	SC	25	14	N	-	-	N	N	N	530264	5693176
P	S42	T04	TA	35	G	P	F	C	75	17	N	-	-	N	Y	N	530266	5693173
P	S42	T05	-	28	D	R	D	SC	75	4	Y	-	-	N	Y	Y	530265	5693170
FS	S44	T01	BP	20	D	D	D	SO	10	4	Y	3	N	Y	Y	Y	530241	5693755
FS	S44	T02	TA	23	G	P	F	SO	5	5.5	N	-	-	N	Y	Y	530234	5693769
FS	S44	T03	TA	17	-	F	F	SO	0	8	N	-	-	N	N	Y	530241	5693770
FS	S44	T04	BP	22	G	P	F	SC	5	8	N	-	-	N	Y	Y	530243	5693777
FS	S44	T05	BP	22	D	D	D	SO	15	4	N	-	-	N	Y	Y	530237	5693782
FS	S44	T06	BP	28	P	G	P	SO	25	6	N	-	-	N	Y	Y	530235	5693780
FS	S44	T06	BP	20	F	D	F	SC	0	6	Y	1.5	N	Y	Y	Y	530239	5693790
FS	S44	T07	BP	29	G	D	F	SO	20	4	N	-	-	N	Y	Y	530245	5693796
FS	S44	T08	BP	24	G	D	F	SO	10	4	Y	4	N	N	Y	Y	530253	5693792
FS	S44	T09	BP	23	G	D	F	SC	25	8	N	-	-	N	Y	Y	530253	5693777
FS	S44	T10	BP	21	G	F	F	SC	10	9	N	-	-	N	Y	Y	530251	5693771
FS	S48	T01	TA	19	G	F	G	SC	5	5	N	-	-	N	Y	Y	531090	5694585
FS	S48	T02	TA	19	G	F	G	SC	10	7	N	-	-	N	N	N	531093	5694585

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S48	T03	TA	19	G	F	G	SC	50	10	N	-	-	N	N	N	531094	5694586
FS	S48	T04	TA	19	G	F	G	SC	0	10	N	-	-	N	Y	Y	531095	5694578
FS	S48	T05	TA	19	G	F	G	SC	5	6	N	-	-	N	Y	Y	531097	5694573
FS	S48	T06	TA	23	F	G	F	SO	0	-	N	-	-	N	N	Y	531096	5694577
FS	S48	T07	TA	28	D	D	D	SO	5	4	N	-	-	N	N	N	531095	5694566
FS	S48	T08	TA	27	P	D	P	O	5	4	N	1.5	E	Y	Y	Y	531098	5694564
FS	S48	T09	TA	18	G	F	G	SO	0	10	N	-	-	N	Y	Y	531093	5694562
FS	S48	T10	TA	34	P	P	P	O	0	3.5	N	-	-	N	Y	Y	531103	5694557
FS	S48	T11	TA	28	G	P	F	SO	10	9	N	-	-	N	Y	Y	531100	5694559
FS	S48	T12	TA	19	G	F	G	SO	5	-	N	-	-	N	Y	Y	531102	5694553
FS	S48	T13	TA	21	G	G	G	O	5	5	N	-	-	N	Y	Y	531103	5694552
FS	S48	T14	TA	19	G	G	G	SO	0	10	N	-	-	N	Y	Y	531102	5694550
FS	S48	T15	TA	20	G	F	G	SO	0	9	N	-	-	N	Y	Y	531105	5694550
FS	S48	T16	TA	22	G	G	G	O	0	7	N	-	-	N	Y	N	531106	5694542
FS	S48	T17	TA	30	D	D	D	SO	10	8	N	-	-	N	Y	Y	531110	5694540
FS	S48	T18	TA	27	G	P	P	SO	50	8	N	-	-	N	Y	Y	531110	5694538
FS	S48	T19	TA	18	D	D	D	O	80	5	N	-	-	N	Y	Y	531110	5694536
FS	S48	T20	TA	27	G	F	G	SO	10	10	Y	3	S	N	Y	Y	531115	5694528
FS	S48	T21	TA	23	P	P	P	O	15	5	Y	2	S	Y	Y	Y	531118	5694522
FS	S48	T22	TA	26	G	F	G	SO	20	10	N	-	-	N	Y	Y	531116	5694521
FS	S48	T23	TA	27	G	F	G	SO	10	10	N	-	-	N	Y	Y	531117	5694522
FS	S48	T24	TA	25	G	G	G	O	0	10	N	-	-	N	N	N	531125	5694524
FS	S48	T25	TA	25	D	D	D	SC	25	10	N	-	-	N	Y	Y	531128	5694495
FS	S48	T26	TA	24	G	F	G	SC	0	10	N	-	-	N	Y	Y	531132	5694519
FS	S48	T27	TA	28	F	F	F	O	15	11	Y	2	S	N	Y	Y	531130	5694522
FS	S48	T28	TA	18	G	G	G	SO	5	10	N	-	-	N	Y	Y	531125	5694522
FS	S48	T29	TA	27	P	F	P	SO	0	-	N	-	-	N	Y	Y	531139	5694525
FS	S48	T30	TA	22	G	G	G	SO	10	10	N	-	-	N	Y	Y	531126	5694518

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S48	T31	TA	19	G	P	F	SO	10	8	N	-	-	N	Y	Y	531143	5694518
FS	S48	T32	TA	25	G	F	G	SO	5	8	N	-	-	N	Y	Y	531144	5694516
FS	S48	T33	TA	24	G	P	F	SC	15	10	N	-	-	N	Y	Y	531124	5694514
FS	S48	T34	TA	20	G	F	G	SO	25	9	N	-	-	N	Y	Y	531121	5694507
FS	S48	T35	TA	24	G	G	G	O	20	10	N	-	-	N	Y	N	531125	5694498
FS	S48	T36	TA	24	F	D	P	SC	15	10	N	-	-	N	Y	Y	531144	5694516
FS	S48	T37	TA	20	G	F	G	SO	5	-	N	-	-	N	Y	Y	531138	5694512
FS	S48	T38	TA	18	G	F	G	SO	0	-	N	-	-	N	Y	Y	531137	5694511
FS	S48	T39	TA	21	D	D	D	SC	5	10	N	-	-	N	Y	Y	531134	5694500
FS	S48	T40	TA	25	D	D	D	SC	0	7	N	-	-	N	Y	Y	531145	5694503
FS	S48	T41	TA	23	G	F	G	SO	15	-	N	-	-	N	Y	Y	531128	5694495
FS	S48	T42	TA	19	F	D	P	SO	0	6	N	-	-	N	Y	Y	531125	5694491
FS	S48	T43	TA	22	G	F	G	SO	0	10	N	-	-	N	Y	Y	531134	5694489
FS	S48	T44	TA	22	G	F	G	SO	0	-	N	-	-	N	Y	Y	531141	5694493
FS	S48	T45	TA	24	G	F	G	SO	0	-	N	-	-	N	Y	Y	531135	5694479
FS	S48	T46	TA	19	G	F	G	SO	10	10	N	-	-	N	Y	Y	531140	5694480
FS	S48	T47	TA	19	G	F	F	SO	0	10	N	-	-	N	Y	Y	531151	5694477
FS	S48	T48	TA	23	G	F	G	SO	5	-	N	-	-	N	Y	Y	531159	5694478
FS	S48	T49	BO	27	F	F	F	SC	10	10	N	-	-	N	Y	Y	531157	5694470
FS	S48	T50	TA	23	F	F	F	SO	0	8	N	-	-	N	Y	Y	531162	5694469
FS	S48	T51	TA	20	D	D	D	SO	20	5	N	-	-	N	Y	Y	531159	5694460
FS	S48	T52	TA	20	D	D	D	SO	50	6	N	-	-	N	Y	Y	531149	5694458
FS	S48	T54	TA	20	F	P	P	SO	0	9	Y	2	E	Y	Y	Y	531150	5694457
FS	S48	T55	TA	19	D	D	D	SO	0	10	N	-	-	N	Y	Y	531145	5694458
FS	S48	T56	TA	23	G	P	F	SC	0	10	N	-	-	N	Y	Y	531167	5694455
FS	S48	T57	TA	21	F	P	F	SO	25	12	N	-	-	N	Y	Y	531192	5694481
FS	S48	T58	BO	34	D	D	D	SO	25	6	Y	1.5	W	Y	Y	Y	531194	5694488
FS	S48	T59	TA	24	F	P	F	SC	0	10	N	-	-	N	Y	Y	531185	5694490

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S48	T60	TA	22	D	D	D	O	15	7	N	-	-	N	Y	Y	531190	5694493
FS	S48	T61	TA	19	D	D	D	SO	0	3	N	-	-	N	Y	Y	531186	5694516
FS	S48	T62	TA	18	D	D	D	SO	0	8	N	-	-	N	Y	Y	531189	5694515
FS	S48	T63	TA	20	G	F	G	SO	0	10	N	-	-	N	Y	Y	531190	5694515
FS	S48	T64	TA	24	D	-	D	O	60	2	N	-	-	N	Y	Y	531185	5694510
FS	S48	T65	TA	19	D	D	D	SO	0	10	N	-	-	N	Y	Y	531174	5694540
FS	S48	T66	TA	23	F	G	F	O	30	10	N	-	-	N	Y	Y	531165	5694568
FS	S48	T67	TA	30	G	F	G	SO	0	10	N	-	-	N	Y	Y	531155	5694569
FS	S48	T68	TA	26	F	P	P	SO	0	5	N	-	-	N	Y	Y	531148	5694585
FS	S48	T69	TA	25	G	F	G	O	10	10	N	-	-	N	Y	Y	531163	5694573
FS	S48	T70	TA	23	G	P	F	SO	10	8	N	-	-	N	Y	Y	531148	5694592
FS	S48	T71	TA	22	F	P	F	SO	0	-	N	-	-	N	Y	Y	531148	5694590
FS	S48	T72	TA	27	F	P	F	SO	15	10	N	-	-	N	Y	Y	531146	5694602
FS	S48	T73	TA	25	F	D	P	O	40	3	N	-	-	N	Y	Y	531146	5694605
FS	S67	-	-	-	-	-	-	-	-	-	N	-	-	N	N	N	531098	5698550
FS	S69	T01	TA	22	G	F	G	SO	5	10	N	-	-	N	N	Y	531505	5698888
FS	S69	T02	TA	20	G	F	G	O	10	10	N	-	-	N	N	Y	531505	5698893
FS	S69	T03	TA	20	G	F	G	O	25	10	N	-	-	N	N	Y	531506	5698897
FS	S69	T04	TA	21	G	F	G	O	10	10	N	-	-	N	Y	Y	531506	5698891
FS	S69	T05	TA	20	G	P	F	O	20	10	N	-	-	N	N	Y	531503	5698898
FS	S69	T06	TA	20	G	D	F	O	0	10	N	-	-	N	Y	Y	531503	5698896
FS	S69	T07	TA	19	G	G	G	O	20	10	N	-	-	N	N	N	531497	5698914
FS	S69	T08	TA	25	G	F	G	SC	50	10	N	-	-	N	Y	Y	531511	5698901
FS	S69	T09	TA	22	G	F	G	SO	0	10	N	-	-	N	Y	Y	531496	5698913
FS	S69	T10	TA	19	G	F	G	SO	50	10	N	-	-	N	Y	Y	531495	5698921
FS	S69	T11	TA	19	G	F	G	SO	5	10	N	-	-	N	Y	Y	531491	5698915
FS	S69	T12	TA	20	G	F	G	SO	5	10	N	-	-	N	Y	Y	531491	5698916
FS	S69	T13	TA	19	G	F	G	SO	20	10	N	-	-	N	Y	Y	531489	5698914



Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S69	T14	TA	20	G	F	G	SO	75	10	N	-	-	N	Y	Y	531485	5698915
FS	S69	T15	TA	23	G	G	G	C	20	12	N	-	-	N	N	N	531486	5698908
FS	S69	T16	TA	20	G	F	G	SO	80	-	N	-	-	N	Y	Y	531484	5698913
FS	S69	T17	TA	19	G	F	G	SO	5	10	N	-	-	N	Y	Y	531486	5698916
FS	S69	T18	TA	19	G	F	G	SO	5	10	N	-	-	N	Y	Y	531488	5698917
FS	S69	T19	TA	25	G	G	G	C	10	12	N	-	-	N	N	N	531483	5698904
FS	S69	T20	TA	18	G	F	G	SO	5	10	N	-	-	N	Y	Y	531487	5698919
FS	S69	T21	TA	21	G	F	G	SO	15	10	N	-	-	N	Y	Y	531483	5698917
FS	S69	T22	TA	27	G	G	G	C	5	12	N	-	-	N	N	N	531484	5698900
FS	S69	T23	TA	24	G	F	G	SO	60	10	N	-	-	N	Y	Y	531479	5698919
FS	S69	T24	TA	28	G	F	G	SC	15	10	N	-	-	N	Y	Y	531481	5698911
FS	S69	T25	TA	22	G	F	G	SC	25	10	N	-	-	N	Y	Y	531485	5698899
FS	S69	T26	TA	22	G	F	G	SC	25	10	N	-	-	N	Y	Y	531485	5698898
FS	S69	T27	TA	22	G	F	G	SC	0	10	N	-	-	N	Y	Y	531481	5698898
FS	S69	T28	TA	21	G	F	G	SC	15	10	N	-	-	N	Y	Y	531481	5698896
FS	S69	T29	TA	29	G	F	F	SC	15	10	N	-	-	N	Y	Y	531483	5698893
FS	S77	T01	TA	24	D	D	D	SO	10	15	N	-	-	N	Y	N	532418	5701001
FS	S77	T02	TA	27	F	P	F	SC	10	15	N	-	-	N	N	N	532418	5701001
FS	S77	T03	TA	24	D	D	D	SO	10	15	N	-	-	N	Y	N	532413	5701005
FS	S77	T04	-	24	D	R	D	SO	5	5	N	-	-	N	Y	Y	532408	5701005
FS	S77	T05	-	23	G	F	F	SO	5	9	N	-	-	N	N	N	532405	5701008
FS	S77	T06	TA	22	D	D	D	SO	10	13	N	-	-	N	Y	N	532399	5701008
FS	S77	T07	-	18	D	R	D	SO	10	5	N	-	-	N	Y	N	532405	5701013
FS	S77	T08	TA	20	D	R	D	SC	25	5	N	-	-	N	Y	N	532409	5701016
FS	S77	T09	TA	28	F	F	F	SO	30	-	N	-	-	N	Y	N	532354	5701080
FS	S77	T09	TA	24	D	D	D	SO	5	15	N	-	-	N	Y	N	532308	5701207
FS	S77	T10	TA	25	D	D	D	SO	10	-	N	-	-	N	N	N	532307	5701203
FS	S77	T12	TA	27	D	D	D	SC	25	-	N	-	-	N	Y	N	532305	5701203

Survey Type <sup>1</sup>	Stand ID	Tree ID	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
					Trunk	Canopy	Overall										Easting	Northing
FS	S77	T13	BP	35	G	P	F	SO	10	-	N	-	-	N	Y	N	532304	5701224
FS	S79	-	-	-	-	-	-	-	-	-	N	-	-	N	N	N	533076	5703140

NOTES:

“-“ indicates no value available

<sup>1</sup> Survey Type = FS (full stand), P (plot), or O (opportunistic)

<sup>2</sup> Tree Species = BO (bur oak [*Quercus macrocarpa*]), BP (balsam poplar [*Populus balsamifera*]), MM (Manitoba maple [*Acer negundo*]), TA (trembling aspen [*Populus tremuloides*]), or WB (white birch [*Betula papyrifera*])

<sup>3</sup> DBH = diameter at breast height

<sup>4</sup> Condition = D (dead), P (poor), F (fair), or G (good)

<sup>5</sup> Understory = O (open: short herbaceous/grazed), SO (semi-open: tall herbaceous/short shrub), SC (semi-closed: tall shrub < 2 m with openings), or C (closed: dense shrub >2 m)

<sup>6</sup> CWD (%) = percent coarse woody debris within 3 m of the decadent tree

<sup>7</sup> Cavity orientation = N (north), E (east), S (south), or W (west)

<sup>8</sup> Coordinate datum: NAD83 UTM Zone 14N

# APPENDIX 3

## Decadent Tree Salvage Tables

Table 3-1: Decadent Trees to be Salvaged

Tree ID <sup>1</sup>	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
			Trunk	Canopy	Overall										Easting	Northing
S01-T02	MM	35	F	F	F	SO	5	11	N	-	-	N	Y	Y	529787	5681686
S04-T13	TA	27	F	F	F	O	25	12	Y	10	N	N	N	N	530887	5685587
S04-T15	TA	27	G	F	F	O	10	20	Y	4	E	N	Y	N	530870	5685572
S04-T21	TA	30	G	F	F	O	10	20	Y	8	W	Y	Y	N	530866	5685511
S04-T26	TA	27	G	F	G	O	30	18	Y	4	N	Y	N	N	530889	5685518
S06-T01	TA	26	G	P	F	O	35	15	N	-	-	N	Y	N	530730	5686022
S06-T03	TA	21	G	P	F	O	30	14	Y	-	-	N	N	N	530733	5686022
S06-T14	TA	30	G	G	G	O	5	17	N	-	-	N	N	N	530709	5686083
S10-T01	BP	32	G	F	F	O	15	11	Y	7	-	Y	Y	N	530645	5688077
S10-T02	BP	30	F	F	F	O	20	13	N	-	-	N	Y	N	530646	5688055
S10-T05	BO	33	G	D	F	O	5	20	N	-	-	N	N	N	530756	5687950
S102-T19	BP	28	G	F	F	O	40	17	N	-	-	N	N	N	530641	5689092
S103-T08	TA	26	G	P	F	O	10	14	N	-	-	N	Y	N	530434	5691502
S104a-T21	TA	37	G	F	G	O	75	12	Y	5	W	N	Y	Y	532196	5701636
S104a-T31	BP	19	F	P	F	SO	50	10	Y	3	N	Y	N	N	532138	5701641
S104a-T77	TA	23	G	P	F	O	25	10	N	-	-	N	N	Y	532103	5701524
S104b-T02	TA	23	G	P	F	O	50	10	N	-	-	N	Y	Y	532394	5701619
S104b-T03	TA	24	G	F	F	SO	50	12	N	-	-	N	Y	Y	532411	5701626
S104b-T04	BP	24	G	P	F	SO	25	10	N	3	N	N	Y	Y	532411	5701626
S104b-T05	TA	21	G	F	G	SO	75	12	Y	6	S	N	Y	Y	532421	5701625
S104b-T06	TA	22	G	P	F	SO	50	10	N	-	-	N	Y	Y	532421	5701630
S104b-T100	TA	26	G	F	G	O	5	10	N	-	-	N	Y	Y	532396	5701635
S104b-T102	BP	22	G	F	G	O	50	10	Y	8	N	Y	Y	Y	532367	5701645
S104b-T104	BP	22	G	F	G	O	10	10	N	-	-	N	Y	Y	532364	5701635



Tree ID <sup>1</sup>	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
			Trunk	Canopy	Overall										Easting	Northing
S104b-T107	BP	25	G	F	G	O	15	10	N	-	-	N	Y	Y	532378	5701665
S104b-T108	TA	27	G	P	F	O	50	11	Y	3.5	S	N	Y	N	532371	5701613
S104b-T111	TA	30	G	F	G	SO	25	12	N	-	-	N	Y	Y	532424	5701644
S104b-T110	BP	23	G	F	G	O	10	10	Y	5	W	Y	Y	Y	532393	5701677
S104b-T111	TA	32	G	F	G	O	25	12	N	-	-	N	Y	Y	532395	5701682
S104b-T116	BP	22	G	F	G	O	40	10	N	-	-	N	N	N	532409	5701680
S104b-T119	BP	22	G	D	F	O	25	11	N	-	-	N	Y	Y	532407	5701681
S104b-T121	BP	25	G	P	F	O	15	10	N	-	-	N	Y	Y	532410	5701695
S104b-T125	TA	33	G	P	F	O	40	12	N	2	E	Y	Y	Y	532392	5701709
S104b-T127	TA	28	G	P	F	O	50	12	Y	9	N	N	Y	Y	532388	5701705
S104b-T131	BP	22	F	P	F	O	10	11	Y	8	S	N	Y	Y	532398	5701664
S104b-T134	TA	30	G	F	G	O	10	12	N	-	-	N	Y	Y	532356	5701696
S104b-T138	TA	24	G	F	G	O	25	10	N	-	-	N	Y	Y	532335	5701693
S104b-T14	BP	24	G	F	G	SO	60	10	N	-	-	N	Y	Y	532424	5701652
S104b-T147	TA	24	G	F	G	O	50	12	N	-	-	N	Y	Y	532382	5701656
S104b-T17	BP	22	G	F	F	SO	75	10	N	-	-	N	Y	Y	532423	5701669
S104b-T81	BP	23	G	P	F	SO	50	10	N	-	-	N	Y	Y	532404	5701662
S104b-T82	BP	23	G	P	F	SO	40	10	N	-	-	N	Y	Y	532414	5701678
S104b-T88	TA	32	G	F	G	O	50	12	Y	4	S	N	Y	Y	532409	5701653
S104b-T89	TA	35	G	F	G	O	15	12	N	-	-	N	Y	Y	532402	5701647
S104b-T93	TA	27	G	F	G	O	50	12	N	-	-	N	Y	Y	532433	5701598
S104b-T94	BP	20	G	F	G	SO	50	12	Y	6	S	Y	Y	Y	532423	5701610
S104b-T97	BP	22	G	P	F	SO	90	10	N	-	-	N	Y	Y	532409	5701606
S104b-T99	TA	22	G	F	G	O	5	10	N	-	-	N	Y	Y	532398	5701641
S12-T01	TA	24	G	P	F	O	5	12	Y	9	W	N	N	N	530580	5688296

Tree ID <sup>1</sup>	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
			Trunk	Canopy	Overall										Easting	Northing
S12-T02	TA	23	G	P	F	O	10	12	N	-	-	N	N	N	530583	5688290
S12-T06	BP	22	G	F	F	O	5	13	N	-	-	N	N	N	530572	5688249
S12-T11	TA	26	G	F	F	O	5	11	N	-	-	N	N	N	530583	5688201
S12-T13	TA	29	G	F	F	O	5	13	N	-	-	N	Y	N	530556	5688176
S12-T16	TA	30	G	P	F	O	30	20	N	-	-	N	N	N	530553	5688166
S12-T20	TA	32	G	G	G	O	30	13	N	-	-	N	Y	N	530551	5687992
S35-T03	BP	35	F	F	F	O	50	17	Y	7	N	Y	Y	N	530312	5691076
S35-T04	TA	33	G	F	G	O	25	20	N	-	-	N	N	N	530317	5691049
S42-T03	TA	24	G	G	G	SC	25	14	N	-	-	N	N	N	530264	5693176
S42-T04	TA	35	G	P	F	C	75	17	N	-	-	N	Y	N	530266	5693173
S48-T20	TA	27	G	F	G	SO	10	10	Y	3	S	N	Y	Y	531115	5694528
S48-T22	TA	26	G	F	G	SO	20	10	N	-	-	N	Y	Y	531116	5694521
S48-T23	TA	27	G	F	G	SO	10	10	N	-	-	N	Y	Y	531117	5694522
S48-T24	TA	25	G	G	G	O	0	10	N	-	-	N	N	N	531125	5694524
S48-T26	TA	24	G	F	G	SC	0	10	N	-	-	N	Y	Y	531132	5694519
S48-T27	TA	28	F	F	F	O	15	11	Y	2	S	N	Y	Y	531130	5694522
S48-T30	TA	22	G	G	G	SO	10	10	N	-	-	N	Y	Y	531126	5694518
S48-T33	TA	24	G	P	F	SC	15	10	N	-	-	N	Y	Y	531124	5694514
S48-T35	TA	24	G	G	G	O	20	10	N	-	-	N	Y	N	531125	5694498
S48-T43	TA	22	G	F	G	SO	0	10	N	-	-	N	Y	Y	531134	5694489
S48-T49	BO	27	F	F	F	SC	10	10	N	-	-	N	Y	Y	531157	5694470
S48-T56	TA	23	G	P	F	SC	0	10	N	-	-	N	Y	Y	531167	5694455
S48-T59	TA	24	F	P	F	SC	0	10	N	-	-	N	Y	Y	531185	5694490
S48-T66	TA	23	F	G	F	O	30	10	N	-	-	N	Y	Y	531165	5694568
S48-T67	TA	30	G	F	G	SO	0	10	N	-	-	N	Y	Y	531155	5694569

Tree ID <sup>1</sup>	Tree Species <sup>2</sup>	DBH (cm) <sup>3</sup>	Tree Condition <sup>4</sup>			Understory <sup>5</sup>	CWD (%) <sup>6</sup>	Tree Height (m)	Cavities Present (Y/N)	Cavity Height (m)	Cavity Orientation <sup>7</sup>	Multiple Cavities (Y/N)	Peeling Bark (Y/N)	Decaying (Y/N)	Coordinates <sup>8</sup>	
			Trunk	Canopy	Overall										Easting	Northing
S48-T69	TA	25	G	F	G	O	10	10	N	-	-	N	Y	Y	531163	5694573
S48-T72	TA	27	F	P	F	SO	15	10	N	-	-	N	Y	Y	531146	5694602
S69-T01	TA	22	G	F	G	SO	5	10	N	-	-	N	N	Y	531505	5698888
S69-T08	TA	25	G	F	G	SC	50	10	N	-	-	N	Y	Y	531511	5698901
S69-T15	TA	23	G	G	G	C	20	12	N	-	-	N	N	N	531486	5698908
S69-T19	TA	25	G	G	G	C	10	12	N	-	-	N	N	N	531483	5698904
S69-T22	TA	27	G	G	G	C	5	12	N	-	-	N	N	N	531484	5698900
S69-T23	TA	24	G	F	G	SO	60	10	N	-	-	N	Y	Y	531479	5698919
S69-T24	TA	28	G	F	G	SC	15	10	N	-	-	N	Y	Y	531481	5698911
S69-T29	TA	29	G	F	F	SC	15	10	N	-	-	N	Y	Y	531483	5698893
S77-T02	TA	27	F	P	F	SC	10	15	N	-	-	N	N	N	532418	5701001

NOTES:

"-" indicates no value available

<sup>1</sup> Each tree has been identified using a metal tag with the corresponding unique Tree ID.

<sup>2</sup> Tree Species = BO (bur oak [*Quercus macrocarpa*]), BP (balsam poplar [*Populus balsamifera*]), MM (Manitoba maple [*Acer negundo*]), TA (trembling aspen [*Populus tremuloides*]), or WB (white birch [*Betula papyrifera*])

<sup>3</sup> DBH = diameter at breast height

<sup>4</sup> Condition = F (fair) or G (good) <sup>5</sup> Understory = O (open: short herbaceous/grazed), SO (semi-open: tall herbaceous/short shrub), SC (semi-closed: tall shrub < 2 m with openings), or C (closed: dense shrub >2 m)

<sup>6</sup> CWD (%) = percent coarse woody debris within 3 m of the decadent tree

<sup>7</sup> Cavity orientation = N (north), E (east), S (south), or W (west)

<sup>8</sup> Coordinate datum: NAD83 UTM Zone 14N

Table 3-2: Decadent Tree Reinstallation Locations

HMA ID <sup>1</sup>	Reinstallation Location ID <sup>1</sup>	Coordinates <sup>3</sup>	
1	a	530375	5682425
	b	530551	5682655
2	a	530685	5685976
	b	530687	5686124
3	a	530941	5686838
	b	530940	5687045
4	a	530934	5687580
	b	530936	5687628
5	a	530358	5690263
	b	530319	5690364
6	a	530694	5690451
	b	530655	5690546
7	a	530194	5690785
	b	530185	5690931
8	a	530189	5691604
	b	530190	5691756
9	a	530569	5691704
	b	530571	5691883
10	a	530573	5692146
	b	530573	5692199
11	a	530202	5693865
	b	530212	5694004
12	a	531152	5694439
	b	531186	5694483



HMA ID <sup>1</sup>	Reinstallation Location ID <sup>1</sup>	Coordinates <sup>3</sup>	
13	a	531302	5695182
	b	531300	5695409
14	a	530916	5695862
	b	530914	5696061
15	a	530909	5696676
	b	530909	5696852
16	a	530907	5697095
	b	530907	5697201
17	a	531081	5698525
	b	531109	5698568
18	a	531913	5698870
	b	531997	5698957
19	a	532092	5700778
	b	532090	5700985
20	a	533525	5703700
	b	533707	5703932

Notes:

<sup>1</sup> Two salvaged trees to be reinstalled per Habitat Mitigation Area (i.e., in locations 'a' and 'b').

<sup>2</sup> Coordinate datum: NAD83 UTM Zone 14N